

of Engineers Kansas City District You Matter - We Care

Child Development Center PN 053135

Fort Riley, Kansas

This is a Design-Build Request for Proposals

April 2002

DEPARTMENT OF THE ARMY Kansas City District, Corps of Engineers 757 Federal Building Kansas City, Missouri 64106

SPECIFICATIONS FOR CONSTRUCTION OF CHILD DEVELOPMENT CENTER PN 053135 FORT RILEY, KANSAS

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APPENDIX A: Subsurface Investigation Report

APPENDIX B: Design Drawings

						DACA4	1-02-R-00	05
		OFFED	1. SOLICITATION NO.	2. TYPE OF SOLICITAT	TION	3. DATE ISSUED	PAGE OF	PAGES
	SOLICITATION, AND AWA			SEALED BID	(IFB)			
	(Construction, Alteration		DACA41-02-R-0005	NEOGTIATED	(RFP)	4/19/2002	1	71
IMP	ORTANT - The "offer" section					17 10/2002		7.
4.			5. REQUISITION/PURG	CHASE REQUEST NO.	6. PROJEC	T NO.		
7.	ISSUED BY	CODE	8.	ADDRESS OFFER TO				
	760 Federal Bui	eer District, Kansas ding, 601 E. 12th S Missouri 64106-289	treet		See	Item 7		
		(816) 983-3845 (816) 426-5169						
9.		A. NAME	V. Smith	B. TELEPHONE NO.	(Include area co	de)	#10.00L	507.044.0
	CALL.	Eail		816-983-3846 CITATION	Ext.		(NO COLL	ECT CALLS)
NOT	TE: In sealed bid solicitation	"offer" and "offeror" me						
10.	THE GOVERNMENT REQUIRE	S PERFORMANCE OF	THE WORK DESCRIBED	IN THESE DOCUMENTS		(Title, identifying no.,	date):	
11.		ment Center (CDC Yout	Fort Ri e a firm, fixed-price c) for school-aged h Activity Center (ent Center, PN 053 ⁻ iley, Kansas e, design-build cons children (ages 6-1 YAC) at Fort Riley,	struction cont 0) immediate Kansas.		n existing	
	award X notice to pro		mance period is X	mandatory,	negotiable	_	-)
12A	THE CONTRACTOR MUS' (If "YES", indicate within how m			NCE AND PAYMENT BO		12B. CALENDAR DA	AYS	
13.								
A.	Sealed offers in original and local time 5/21/2002 containing offers shall be m	(date). If this is	a sealed bid solicitation	red are due at the place on, offers will be publicly ess, the solicitation num	y opened at that	time. Sealed envel	•	
B.	An offer guarantee	X is, is not re	quired.	NOT TO EXCEE	D 20%	OF TOTAL BID A	MOUNT	
C.	All offers are subject to the reference.	(1) work requirements	s, and (2) other provision	ons and clauses incorpo	orated in the soli	citation in full text o	r by	
D.	Offers providing less than will be rejected.	90 calendar da	ays for Government ac	cceptance after the date	e offers are due v	vill not be considere	ed and	

STANDARD FORM

Prescribed by GSA FAR (48 CFR) 53.236-1(d)

1442

(REV. 4-85)

1442 102

NSN 7540-01-155-3212

DACA41-02-R-0005	OFFER	(Must be fully comp	leted by offeror)						
14. NAME AND ADDRESS OF OFFEROI		de ZIP Code)	15. TELEPHO	ONE NO.	(Include area	a code)			
			(FAX #)				
			16. REMITTANCE ADDRESS (Include only if different from Item 14)						
DUNS NO: CODE FACILITY CO	DE.								
		rians appoiling halour i	a atriat accordance u	ith the terms	of this policitot	ion if this offer is a			
 The offeror agrees to perform the work requestive by the Government in writing within 		ar days after the date				or greater than th		. _	
quirement stated in Item 13D. Failure to in						or greater than th	c miniminam re		
ļ									
AMOUNTS: See attached Proposal S	chedule.								
40. The effects access to formical accordance	:		la a se al a						
18. The offeror agrees to furnish any requ	-	9. ACKNOWLEDG		NDMENTS					
(The offeror act		receipt of amendm			umber and d	ate of each)			
AMENDMENT NO.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		J					
DATE 20A. NAME AND TITLE OF PERSON AL	JTHORIZEI	O TO SIGN OFFER		20B. SIGN	ATURE		20C. OFFE	ER DATE	
(Type or print)	,			2021 01011			200. 0		
(Type or print)		AWARI	(To be complete	ed by Gover	nment)				
21. ITEMS ACCEPTED			,		- /				
22. AMOUNT		23. ACCOUNTING	AND APPROPRI	IATION DAT	ГА				
24. SUBMIT INVOICES TO ADDRESS S (4 copies unless otherwise specified		ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO						
26. ADMINISTERED BY	CODE		10 U.S.C. 2304(c) () 41 U.S.C. 253(c) ()						
			27. PAYMENT W	ILL BE MAI	DE BY				
CON	TRACTING	OFFICER WILL CO	MPLETE ITEM 2	8 OR 29 AS	APPLICABL	E			
28. NEGOTIATED AGREEMENT (C	Contractor is	required to sign this	29 AWARD	(Contractor is	e not required :	to sign this docum	ant)	Your offer	
document and return copies to issuir		Contractor agrees	on this solicitation is	•	•	•	•	rour oner	
to furnish and deliver all items or perform all work requirements identified			summates the contr						
on this form and any continuation sheets for the consideration stated in this			your offer, and (b) th	nis contract av	ward. No furth	er contractual docu	ıment is		
contract. The rights and obligations of the partie	es to this con	tact shall be	necessary.						
governed by (a) this contract award, (b) the solid	citation, and ((c) the clauses,							
representations, certifications, and specifications	s incorporate	d by reference							
in or attached to this contract. 30A. NAME AND TITLE OF CONTRACTOR OF	D DEDSON A	NITHODIZED	31A. NAME OF CO		DEEICER	(Type or print)			
TO SIGN (Type of print)	TONIZED	JA. INAME OF CO	MILITALING (JI I IOLK	(Type of pillil)				
30B. SIGNATURE			31b. UNITED STAT	TED OF AME	RICA		31C. A	WARD	
			DATE					TE	
							1		

STANDARD FORM 1442 BACK (REV. 4-85)

SECTION 0	0010 Solicitation Contract F	Form			
ITEM NO 0001	SUPPLIES/SERVICES DESIGN	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT

NET AMT

ITEM NO SUPPLIES/SERVICES QUANTITY UNIT UNIT PRICE AMOUNT 0002 1.00 Lump Sum

CONSTRUCT CDC BLDG

FFP - The lump sum amount includes construction of the CDC Building and all associated site work (excepting landscaping outside fenced area, and Composite Play Structure and associated protective surfacing).

NET AMT

ITEM NO SUPPLIES/SERVICES QUANTITY UNIT UNIT PRICE AMOUNT 0003 1.00 Lump Sum

AS-BUILTS, O & M MANUALS AND USER TRAINING

FFP - As-Built Drawings, O & M Manuals, and required User Training. The value of these services has pre-set by the Government at \$30,000.00.

NET AMT

ITEM NO SUPPLIES/SERVICES QUANTITY UNIT UNIT PRICE AMOUNT 0004 1.00 Lump Sum OPTION - COURTYARD AND CANOPY

FFP - Courtyard architectural paving and canopy between the YAC and the New Child Development Center. The lump sum amount includes all design and construction, including additive and deductive changes to the design, necessary to incorporate this option into the contract.

NET AMT

ITEM NO SUPPLIES/SERVICES QUANTITY UNIT UNIT PRICE AMOUNT 0005 1.00 Lump Sum

OPTION - COMMUNICATION DUCT BANK

FFP - This Option includes installing the communications cabling in handholes and conduit, as indicated by keynotes 9 and 10 of sheet C 10.1. The lump sum amount includes all design and construction, including additive and deductive changes to the base design, necessary to incorporate this option into the contract.

NET AMT

AMOUNT

N/A

0006 Lump Sum 1.00 OPTION - LANDSCAPING OUTSIDE FENCED AREA FFP - This option includes the landscaping associated with areas outside the fenced area, as described in Section 01012, paragraph 1.6.10. The lump sum amount includes all design and construction, including additive and deductive changes to the base design, necessary to incoporate this option into the contrac. **NET AMT** ITEM NO SUPPLIES/SERVICES **QUANTITY UNIT UNIT PRICE AMOUNT** 0007 1.00 Lump Sum OPTION - COMPOSITE PLAY STRUCTURE & PROTECTIVE SUR FFP - COMPOSITE PLAY STRUCTURE AND ASSOCIATED PLAYGROUND PROTECTIVE SURFACING: The lump sum amount includes all design and construction, including additive and deductive changes to the base design, necessary to incorporate this option into the contract. **NET AMT** GRAND TOTAL BASE INCLUDING OPTIONS..... **DELIVERY INFORMATION CLINS** UNIT OF ISSUE QUANTITY FOB SHIP TO ADDRESS **DELIVERY DATE** 0001 Lump Sum 1.00 Dest. INSPECTION AND ACCEPTANCE TERMS Supplies/services will be inspected/accepted at: **INSPECT AT INSPECT BY** ACCEPT AT ACCEPT BY **CLIN**

N/A

N/A

ITEM NO

0001

N/A

SUPPLIES/SERVICES

QUANTITY

UNIT

UNIT PRICE

CLAUSES INCORPORATED BY FULL TEXT

FIELD OFFICE OVERHEAD

NOTICE TO BIDDERS: For your bid to be responsive, you must declare below the <u>single</u> accounting practice that you apply to contracts to calculate field office overhead for all change orders, modifications and requests for equitable adjustment. Pursuant to Federal Acquisition Regulations (FAR) Parts 31.105(d)(3) and 31.203(d)(1), an accounting practice that varies from modification to modification is not allowable. Select one of the following:

1. 7	FIME DISTRIBUTION BASE FOR A PER DIEM RATE If you use this practice, see Special Clause "Field Office Overhead Per Diem Rate"	
2. I	DIRECT COST DISTRUBITION BASE FOR A PERCENTAGE MARKUP If you use this practice, see Special Clause "Field Office Overhead Percentage Markup"	
	OTHER ACCOUNTING PRACTICE THAT IS ALLOWABLE DER THE FAR AND THAT USES A <u>SINGLE</u> DISTRIBUTION BASE.	
THI	U MUST DESCRIBE THE ACCOUNTING PRACTICE IN SUFFICIENT IE CONTRACTING OFFICER TO DETERMINE WHAT ACCOUNTING PROPOUR COMPANY AND THAT IT COMPLIES WITH THE FAR.	

FAILURE TO FULLY COMPLY WITH THE ABOVE REQUIREMENT OR, IF ALTERNATIVE 3 IS DECLARED AND YOUR DESCRIPTION DOES NOT CLEARLY STATE OR DESCRIBE A CONSISTENT ACCOUNTING PRACTICE USING A SINGLE DISTRIBUTION BASE, WILL BE CAUSE FOR YOUR BID TO BE REJECTED AS NON-RESPONSIVE.

NOTES:

- (1) Proposal prices must be entered for all items of the Proposal Schedule. Award will be made as a whole to one Contractor on the basis of price and other factors. Offeror's attention is directed to SECTION 00120 PROPOSAL EVALUATION AND CONTRACT AWARD for further details.
- (2) If a modification to an offer is submitted which provides for a lump sum adjustment to the total cost, the application of the lump sum adjustment to each price in the Proposal Schedule must be stated. If it is not stated, the offeror agrees that the lump sum adjustment shall be applied on a pro rata basis to every price in the Proposal Schedule.
- (3) Offeror's attention is directed to SECTION 00100 paragraph titled "Arithmetic Discrepancies" wherein are procedures for correction of errors.
- (4) Offeror's attention is directed to SECTION 01100: GENERAL for special provisions pertaining to this Solicitation.
- (5) Offeror's attention is directed to SECTION 01100, paragraph titled "Kansas Sales and Use Tax".
- (6) The general outline of the principal features of each item as listed does not in any way limit the responsibility of the offeror for making a thorough investigation of the drawings and specifications to determine the scope of work included in each item.
- (7) Offeror's attention is directed to the CONTRACT CLAUSES wherein the apparent successful offeror is required to submit a small business and small disadvantaged business -subcontracting plan. The subcontracting plan shall be submitted in the format that appears at the end of SECTION 00600. Submission of the plan is required prior to award. Award will not be made under this solicitation before the Contracting Officer approves the plan.
- (8) Determination of the Offeror's total price for the proposed work will be based on the TOTAL of the BASE SCHEDULE and OPTION SCHEDULE. Immediate award will be made of the BASE SCHEDULE. At the option of the Government, the OPTION SCHEDULE may be awarded at the proposal price after Notice of Award for the BASE SCHEDULE work. The Government does not guarantee any work beyond that of the BASE SCHEDULE. The Government reserves the right to pick up the OPTION SCHEDULE at the proposal price within 120 calendar days, after the Notice to Proceed. Offeror's attention is directed to SECTION 00100, paragraph titled "Evaluation of Options", for further details.
- (9) Offeror's attention is directed to the CONTRACT CLAUSES, FAR 52.223-9, Certification and Estimate of Percentage of Recovered Material Content for EPA-Designated Items. Certification will be required upon contract completion unless the Contracting Officer has approved a waiver. The waiver must be approved prior to contract award.
- (10) The Government will procure this facility through a Best value competitive acquisition in accordance with the provisions set forth in the Request for Proposal (RFP).

POINTS-OF-CONTACT

CONTRACT Earl V. Smith 816-983-3846 Earl.V.Smith@usace.army.mil

SPECIALIST:

PROJECT Clifton J. Rope 816-983-3476 <u>Clifton.J.Rope@usace.army.mil</u>

MANAGER:

CAUTION!

BEFORE SIGNING AND MAILING THIS PROPOSAL, please take note of the following, as failure to perform any one of these actions may cause your offer to be rejected.

- 1. AMENDMENTS: Have you acknowledged receipt of ALL Amendments? If in doubt as to number of amendments issued, please contact our office.
- 2. SEALED PROPOSALS: Sealed envelopes containing proposals shall be marked to show the offeror's name and address, the solicitation number, amendments received, and the date and time proposals are due.
- 3. AMENDED PROPOSAL PAGES: If any of the Amendments furnished amended proposal pages, the amended proposal pages must be used in submitting your proposal.
- 4. LATE PROPOSALS: In order for a late mailed proposal to be considered, generally it must have been sent by either registered or certified mail not later than 5 calendar days before the receipt of proposals date.
- 5. PROPOSAL GUARANTEE: Sufficient proposal guarantee in proper form must be furnished with your proposal, if your proposal exceeds \$50,000.
- 6. MISTAKE IN PROPOSAL: Have you reviewed your proposal prices for possible errors in calculations or work left out?
- 7. TELEGRAPHIC MODIFICATIONS: If you modify your proposal by telegram, be sure to allow sufficient time for the telegram to reach us prior to the time set for receipt of proposals. Any doubt should be resolved in favor of allowing Extra Time.
- 8. FACSIMILE PROPOSALS, MODIFICATIONS, OR WITHDRAWALS: Will not be considered.
- 9. SECTION 00600: Certifications must be completed and submitted with your proposal. Small Business and Small Disadvantaged Business Subcontracting Plan, found at the end of Section 00600, must be submitted prior to award.
- 10. HAND-DELIVERED PROPOSAL: If proposals are hand-delivered, you must be aware of security requirements in effect in the Federal Building. No additional time will be allowed due to security requirements.
- 11. BUY AMERICAN ACT: All offerors are cautioned that, prior Government conduct notwithstanding, the Contractor's selection of a domestic construction material (as defined in SECTION 00700) which would require the subsequent selection of a foreign construction material for compatibility is not a justification for waiver of the Buy American Act. It is the Contractor's responsibility to verify, prior to submitting the materials for approval, that each system can be built to meet the contract specifications without the use of foreign construction materials.

PLANS AND SPECIFICATIONS

This Request For Proposal (RFP) will be available only on CD-ROM, and will be free of charge. A street address must be provided when requesting a CD-ROM. Requests for the CD-ROM must be made via the Internet at http://www.nwk.usace.army.mil/contract/contract.html.

THE MAGNITUDE OF THIS PROJECT IS REPRESENTED BY THE FOLLOWING ESTIMATED PRICE RANGE (See FAR 36.204): **Between \$5,000,000.00 and \$10,000,000.00**.

SECTION 00100 Bidding Schedule/Instructions to Bidders

CLAUSES INCORPORATED BY REFERENCE:

52.211-2	Availability of Specifications Listed in the DoD Index of	DEC 1999
	Specifications and Standards (DODISS) and Descriptions Listed in	
	the Acquisition Management Systems and Data Requirements	
	Control List, DOD 5010.12-L	
52.215-20	Requirements for Cost or Pricing Data or Information Other Than	OCT 1997
	Cost or Pricing Data	
52.228-1	Bid Guarantee	SEP 1996
52.246-21	Warranty of Construction	MAR 1994

CLAUSES INCORPORATED BY FULL TEXT

COST LIMITATION – TARGET CEILING (JUNE 1999)

The target ceiling for contract award for design and construction is \$6,000,000.00 based on the funds made available for this project. The Government cannot guarantee that additional funds will be made available for award. Offerors are under no obligation to approach this ceiling.

52.204-6 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUN 99)

- (a) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" followed by the DUNS number that identifies the offeror's name and address exactly as stated in the offer.
- (b) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:
- (1) Company name.
- (2) Company address.
- (3) Company telephone number.
- (4) Line of business.
- (5) Chief executive officer/key manager.
- (6) Date the company was started.
- (7) Number of people employed by the company.
- (8) Company affiliation.
- (c) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet Home Page at http://www.customerservice@dnb.com. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@mail.dnb.com.

(End of provision)

52.215-1 INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (MAY 2001)

(a) Definitions. As used in this provision--

"Discussions" are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer's discretion, result in the offeror being allowed to revise its proposal.

In writing, writing, or written means any worded or numbered expression that can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

"Proposal modification" is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

"Proposal revision" is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.

"Time", if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

- (b) Amendments to solicitations. If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).
- (c) Submission, modification, revision, and withdrawal of proposals. (1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.
- (2) The first page of the proposal must show--
- (i) The solicitation number;
- (ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);
- (iii) A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item:
- (iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror's behalf with the Government in connection with this solicitation; and
- (v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.
- (3) Submission, modification, or revision, of proposals.

- (i) Offerors are responsible for submitting proposals, and any modifications, or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that proposal or revision is due.
- (ii)(A) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and--
- (1) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or
- (2) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or
- (3) It is the only proposal received.
- (B) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.
- (iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.
- (iv) If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.
- (v) Proposals may be withdrawn by written notice received at any time before award. Oral proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision at 52.215-5, Facsimile Proposals. Proposals may be withdrawn in person by an offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.
- (4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.
- (5) Offerors shall submit proposals in response to this solicitation in English, unless otherwise permitted by the solicitation, and in U.S. dollars, unless the provision at FAR 52.225-17, Evaluation of Foreign Currency Offers, is included in the solicitation.
- (6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.
- (7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.
- (8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting Officer.
- (d) Offer expiration date. Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

- (e) Restriction on disclosure and use of data. Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall--
- (1) Mark the title page with the following legend: This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of--or in connection with-- the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets]; and
- (2) Mark each sheet of data it wishes to restrict with the following legend: Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.
- (f) Contract award. (1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.
- (2) The Government may reject any or all proposals if such action is in the Government's interest.
- (3) The Government may waive informalities and minor irregularities in proposals received.
- (4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.
- (5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.
- (6) The Government reserves the right to make multiple awards if, after considering the additional administrative costs, it is in the Government's best interest to do so.
- (7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.
- (8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.
- (9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.
- (10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.
- (11) The Government may disclose the following information in postaward debriefings to other offerors:

- (i) The overall evaluated cost or price and technical rating of the successful offeror;
- (ii) The overall ranking of all offerors, when any ranking was developed by the agency during source selection;
- (iii) A summary of the rationale for award; and
- (iv) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror.

(End of provision)

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a single firm-fixed price contract resulting from this solicitation.

(End of clause)

52.217-5 EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

(End of Provision)

52.222-38 COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS (DEC 2001)

By submission of its offer, the offeror represents that, if it is subject to the reporting requirements of 38 U.S.C. 4212(d) (i.e., if it has any contract containing Federal Acquisition Regulation clause 52.222-37, Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans), it has submitted the most recent VETS-100 Report required by that clause.

(End of provision)

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from

Charlene A. Points USAED Kansas City 760 Federal Building 601 E 12th Street Kansas City, MO 64106-2896

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995) – ALTERNATE I (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) An organized site visit has been scheduled for--

7 May 2002

(c) Participants will meet at--

Building 337, upstairs classroom at 10:00 AM. Building 337 is located on the Main Post next to the Main Public Works Directorate Building.

- (d) Offerors are advised that enhanced security measures are in effect at the installation, allow extra time to clear security checkpoints. Visitors must present vehicle registration and proof of insurance as well as a valid government issued photo ID (driver's license, passport, etc.).
- (e) Point of contact at Fort Riley is Mr. Alan Gerth, e-mail alan.v.gerth@usace.army.mil

52.236-28 PREPARATION OF PROPOSALS--CONSTRUCTION (OCT 1997)

- (a) Proposals must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a proposal must initial each erasure or change appearing on any proposal form.
- (b) The proposal form may require offerors to submit proposed prices for one or more items on various bases, including--
- (1) Lump sum price;
- (2) Alternate prices;
- (3) Units of construction; or
- (4) Any combination of paragraphs (b)(1) through (b)(3) of this provision.
- (c) If the solicitation requires submission of a proposal on all items, failure to do so may result in the proposal being rejected without further consideration. If a proposal on all items is not required, offerors should insert the words "no proposal" in the space provided for any item on which no price is submitted.
- (d) Alternate proposals will not be considered unless this solicitation authorizes their submission.

(End of provision)

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

http://www.arnet.gov/far/http://web2.deskbook.osd.mil/default.asphttp://web2.deskbook.osd.mil/default.asp

http://acqnet.saalt.army.mil/library/AFAR/AFARS_OCTOBER_2001.pdf http://www.hq.usace.army.mil/cepr/asp/library/efar.asp?strCat=7&strSubCat=7

252.209-7003 COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS (MAR 1998)

By submission of its offer, the offeror represents that, if it is subject to the reporting requirements of 37 U.S.C. 4212(d) (i.e., the VETS-100 report required by Federal Acquisition Regulation clause 52.222-37, Employment Reports on Disabled Veterans and Veterans of the Vietnam Era), it has submitted the most recent report required by 38 U.S.C. 4212(d).

BID BOND REQUIREMENTS (DEC 1989) (FAR 28.101-2): If your bid exceed \$50,000.00, the bid bond shall be in the amount of 20% of the bid price of \$3,000,000, whichever is the lesser amount. (See CONTRACT CLAUSE titled "Bid Guarantee."

SECTION 00110

SUBMISSION REQUIREMENTS AND INSTRUCTIONS

1. PROPOSAL SUBMITTAL

Proposals for the work described herein, will be received until the date and time indicated on Standard Form 1442 in Section 00010, at the following address:

U.S. Army Engineer District, Kansas City 757 Federal Building 601 East 12th Street ATTN: CENWK-CT-C/Mr. Earl Smith Kansas City, Missouri 64106-2896

2. PROPOSAL FORMAT

a. The Technical Proposal (Volume 1) shall be no more than thirty (30) pages long, excluding Specific Personnel Resumes and Design and Construction Experience forms. Past Performance Evaluation Forms will be submitted by Offeror references and are not included in the page limitation. Proposals shall be submitted in accordance with format instructions described below.

	Originals	Copies
VOLUME 1 - Technical Proposal	Ĭ	4
VOLUME 2 - Price Proposal	1	2

b. All text must be legible and easily read and printed on standard 8-1/2" x 11" paper. If fold-out charts are unavoidable, 11" x 17" paper shall be used, and folded to 8-1/2 inch by 11 inch sheet size with title visible at bottom right corner. 11" x 17" sheets will count as 2 pages. All text shall be single-space type, minimum 11 point font size, with 1-inch margins.

- c. Volume 1 shall be contained within a 3-ring binder. Volume 1 should contain a Table of Contents, List of Tables, List of Figures, List of Appendices, List of Acronyms: These will not count toward the page limitation. Section dividers will not count toward the page limitations. Page numbers, volume number and Offeror name shall be included in the header or footer on each page. Each evaluation factor and subfactor shall be described in a separate and tabbed section of Volume 1. Resumes of key individuals and the Design and Construction Experience forms shall be included in separate Volume 1 appendixes. Elaborate presentations, expensive illustrations, reproduction techniques, report bindings, etc. are not necessary or desired.
- d. Volume 2 should be provided in a separate sealed envelope. Volume 2 need not be submitted in a 3-ring binders and may be stapled. Volume 2 shall include the completed SF1442, a completed bid schedule and Section 00600 Certifications and Representations (See paragraph 4). Offerors may be required to provide complete cost and pricing data and certification or information other than cost or pricing data at a later date if needed to adequately evaluate price proposals.
- e. Proposals will become property of the Government and will not be returned. After selection and contract award, if any, proposals will be disposed of as follows: all originals and any copies of other than the successful proposal will be destroyed. Destruction certification will not be furnished.

3. PROPOSAL CONTENT

- a. The Government intends to award one contract based on initial proposals received, without discussions, to the offeror whose Proposal provides the Best Value to the government as determined using the Evaluation Factors and subfactors described below. The Government may request additional information from Offerors, which clarifies, supplements and/or changes, any proposal as submitted.
- b. Each offeror's ability to perform the work set forth in this solicitation will be evaluated and rated on the basis of the information provided in the proposal. The evaluation will be based solely on the information included in the proposals. Knowledge of the RFP requirements is a prerequisite to preparing proposals, however, restatement of the RFP requirements shall be avoided: Offerors should read and understand the information being requested in this paragraph, and emphasize knowledge and understanding of work performance, not work identification.
 - c. The following factors and subfactors will be used to evaluate each proposal.

FACTOR 1 -- PERFORMANCE CAPABILITY:

- (a) Management Plan: Organization; technical approach; preliminary design and construction schedule; and quality control, subcontracting and management strategies;
- (b) Specific Personnel Experience: Experience of Managers, designers and technical personnel who will be responsible for the day-to-day design and construction activities;
- (c) Offeror Design Experience;
- (d) Offeror Construction experience;
- (a) Management Plan: Fully identify and describe your proposed organization in narrative and using organization charts and your technical approach and strategy to manage and execute the design, construction, training and warranty support, and project turnover.

Note that this solicitation requires the Offeror to propose a specific team, including specific design firms, key subcontractors and key individuals, which/whom will be considered during the Proposal evaluation process. Offeror shall identify key personnel to be assigned to the project, to include: principal managers, designers and technical personnel who will be directly responsible for the day-to-day design and construction activities. State which individuals will be the registered designers of record and responsible for the various design disciplines.

Offeror shall describe its Technical Approach, including key work features, architectural compatibility and Interior Design issues important to the subject acquisition, structural design and HVAC considerations, and D-B scheduling considerations which may affect ongoing activities at the Youth Activity Center.

Describe the Home Office organization, responsibilities and lines of authority established for this project.

Describe the onsite design-construct management team and the plan for managing subcontract acquisition, execution and administration.

Explain procedures for coordinating design development between the designer, general (construction) contractor and key subcontractors. Describe your plan and organization for warranty support.

Self-performed work: Identify the percentage of self-performed work (See FAR 52.236-1), describe which parts of the project will be self-performed by in-house forces and provide the calculation used to derive the percentage of self-performed work.

Quality control strategy: Discuss authorities and functions of the Q.C. Manager and all Q.C. positions; minimum required qualifications for each position in the Q.C. Organization; basic Q.C. procedures, including the reviews and inspections during the various phases of design and construction; and systems to track corrective actions; and procedures for the resolution of government review comments. (Please note that the DrChecks internet based comment system will be used on this project.)

Preliminary schedule: Provide a graphical preliminary schedule for design and construction, which identifies the major design and construction milestones. The purpose of the schedule is to demonstrate the offeror's understanding of the design build process, the management strategy and project requirements. The preliminary schedule will be replaced with a final schedule following contract award. Identify the scheduling software to be used and describe how schedules will be maintained, update and utilized.

(b) Specific Personnel Experience: Using the format provided for the *Specific Personnel Resumes* at the end of this section, Offeror shall provide the information listed, including a description of experience relevant to the subject acquisition. For key individual design personnel, experience shall be within the past 3 years from the RFP issue date. For key individual construction personnel, experience shall be within the past 5 years from the RFP issue date. These are key individuals, in accordance with contract clause "Key Personnel, Subcontractors and Outside Associates or Consultants" (See Section 00800).

<u>Designer Personnel</u>: As a minimum, include Specific Personnel Resumes for the following key individuals, if applicable to this project: Design Project Manager; Project Architect; Project Interior Designer; other specialized design engineers and consultants relevant to this acquisition; all lead engineers responsible for engineering design and the Design Quality Manager.

<u>Construction Personnel</u>: As a minimum include Specific Personnel Resumes for the following key individuals, if applicable to this project: Prime Contractor (or Joint Venture) Program Manager; the Construction Project Manager; Onsite Supervisor with overall site responsibility; and Quality Control Manager.

(c) and (d) Offeror Experience: Provide a list of example projects and in an appendix, provide the completed *Design and Construction Experience Forms* for each example project. Offeror will utilize the *Design and Construction Experience Form* at the end of this section and provided as an MS Word file on the compact disk (CD). Every *Design and Construction Experience Form* will include a concise explanation of the project scope, relevance to the subject acquisition and the Offeror's (or key subcontractor's) role in the project (prime, subcontractor or joint venture partner). All information on the Design and Construction Experience Form shall be provided, including points of contact (names, current employer and current telephone numbers).

A project of *Similar* type, size and complexity is considered to be a Child Development Center (CDC) for school-age children (age range generally 6-10 years old), sized to accommodate at least 100 or more children or a Youth Activity Center, located at a U.S. Army installation. *Closely related* facilities of similar size and complexity include Child Development Centers for 100 or more children and Youth Activity Centers located at U.S. Military installations, grade schools and middle schools, and other institutional facilities built to accommodate children in the 6-10 year old age group.

<u>Prime (or Construction) Contractor(s)</u>: Provide a minimum of five (5) and a maximum of seven (7) examples of similar and closely related projects completed within the past five (5) years or which are currently under contract and more than 50% complete.

A-Es and /or Key Design Subcontractor(s): Provide a minimum of five (5) and a maximum of ten (10) examples (total number of examples) of similar and closely related projects completed within the past three (3) years or which are currently under contract and more than 50% complete.

Offerors may submit example projects that are not similar and closely related to the subject acquisition; however, the evaluators will consider relevancy of the example projects when developing ratings for this subfactor.

It is not mandatory that Offerors possess Design Build experience to be awarded a contract; however, the evaluators will consider Design-Build project experience important and relevant when developing ratings for this subfactor.

Identify the subcontracting goals (if any) and the actual percentages of subcontracted dollars that were awarded and performed by small businesses, small disadvantaged businesses, and women owned small businesses. The percentage for small businesses should include all small businesses, including disadvantaged and women owned businesses. SF 294s, where available shall be attached to the Design and Construction Experience Forms.

Offeror shall provide the following information in the *Design and Construction Experience Form* or as an attachment:

(a) SF 294s, where available. If the project was done for a non-federal organization, information normally provided on a SF 294 will be provided.

- (b) Brief description of the circumstances surrounding the following as they apply and any corrective action taken to preclude recurrence:
 - (i) Contract termination, in whole or in part.
 - (ii) Failure to complete awarded work.
 - (iii) Liquidated damages or actual damages assessed for delay in meeting completion dates.

FACTOR 2 -- PAST PERFORMANCE:

Offerors shall utilize the *Past Performance Evaluation forms* (also referred to as Past Performance Questionnaires) at the end of this section and provided as an MS Word file on the solicitation Compact Disk. Offerors should utilize the *Recommended Past Performance Evaluation Transmittal Letter* included at the end of this section and provided as an MS Word File on the CD. The following subfactors will be evaluated

2a. Past Performance: Design

- 2.a.1 Customer satisfaction
- 2.a.2 Quality, Function and Service
- 2.a.3 Timeliness of performance

2.b. Past Performance: Construction

- 2.b.1 Customer satisfaction
- 2.b.2 Quality, Function and Service
- 2.b.3 Timeliness of performance

Ratings for the Past Performance subfactors will be developed using information provided by references listed on the *Design and Construction Experience Forms* and information from other sources. The Government reserves the right to utilize past performance information from sources other than those identified by the offeror, including, but not limited to past performance evaluations in the A-E Contract Administration Support System (ACASS) and Construction Contractors Appraisal Support System (CCASS). Offerors shall fill out portions of the *Past Performance Evaluation Forms*, as indicated, and transmit the forms to the references, along with a copy of the *Design and Construction Experience Form* for that project.

Past Performance Evaluations must be provided by the offeror to persons who have knowledge of this information on past performance. Once completed, these evaluations must be sent directly to the address in paragraph: PROPOSAL SUBMITTAL, above, by the persons completing these evaluations. Offeror may also e-mail the questionnaires to the references, who may then electronically complete the questionnaire and e-mail it to Mr. Earl V. Smith, Earl.V.Smith@usace.army.mil.

Offerors are responsible for ensuring that references have completed and mailed or faxed legible Past Performance Evaluation Forms to the government. Completed Past Performance Evaluation Forms must be received by the Contracting Officer not later than the Proposal due date.

FACTOR 3 -- PRICE.

Offerors shall submit the Price Proposal (Section 00010), in Volume 2.

- 4. VOLUME 2 PRICE PROPOSAL, REPRESENTATIONS AND CERTIFICATIONS, AND SF 1442
 - a. The Price Proposal shall be organized as follows:
 - Cover Sheet
 - Tab A Preliminary Design and Construction Schedule (Same as in Volume 1)
 - Tab B Certification
 - Tab C Price Proposal
- b. The Price Proposal will be evaluated in accordance with Source Selection procedures described in Section 00120 (PROPOSAL EVALUATION AND CONTRACT AWARD).
- c. Offeror shall check or complete all applicable boxes or blocks of the solicitation document and resubmit the pages marked "RETURN PAGES" as part of Volume 2.
 - d. Additional information to be included in Volume 2:
 - The Offer (the SF1442) duly executed with an original signature by an official authorized to bind the company.
 - Acknowledgement of all amendments to the solicitation in accordance with the instructions on the Standard Form 30 (amendment form).
 - The completed Section 00600 of the solicitation (Representations and Certifications).
 - Joint Ventures information (see below), if applicable.
- e. Joint Ventures: In addition to organization and management strategy information provided for Factor 1, Joint Ventures shall submit the following additional documentation regarding their business entities:
 - A certified copy of their Joint Venture agreement.
 - A detailed statement outlining the following in terms of percentages, where appropriate.
 - The relationship of the joint venture parties in terms of business ownership, capital contribution, and profit distribution or loss sharing.
 - The bonding responsibilities of the joint venture parties.
 - Identification of the key personnel having authority to legally bind the joint venture to subcontracts and state who will provide or contract for the labor and materials for the joint venture.

- Identification of party maintaining the joint venture bank accounts for the payment of all expenses and the deposits of all receipts, keep the books and records, and pay applicable taxes for the joint venture.
- Identification of party furnishing the facilities, such as office supplies and telephone service.
- Identification of party having overall control of the joint venture.
- Whether key personnel are employees of the individual joint venture parties.
- Please note that if one of the joint venture parties possesses experience and/or past performance as a Federal Government contractor or as a Corps of Engineers contractor, that experience and/or past performance will be included as the experience and/or past performance of the joint venture.

SPECIFIC PERSONNEL RESUME

Pro	wide	e the	info	rmation	the f	ollowi	no key	z indi	viduals	identi	fied	in th	e Man	agement	Plan
110	, v I CI (c thic	111101	munon	uic i	OHOWA	IIS NO	y IIIG	Vidual	, iuciiu	IIICU	111 111	C IVIUI	agomon	ı ıuıı.

Name and Title:

Assigned Role on Project:

Name of Firm & # years with firm:

Education: Degrees, University and year obtained:

Current Professional Registrations, Registration number and State:

Specific experience and qualifications relevant to this project:

RECOMMENDED PAST PERFORMANCE EVALUATION TRANSMITTAL LETTER

	Date:
To:	
Our firm plans to submit a Proposal for a Design-Build Corps of Engineers, Kansas City District. (If a subcontract listed as a key subcontractor in a Proposal for a Design-B Corps of Engineers, Kansas City, District.) In accordance (FAR), the Corps of Engineers will evaluate Offeror and kelisted your firm as a reference for the	tor, please use the following: Our firm is being build project being advertised by the U.S. Army with the Federal Acquisition Regulations bey subcontractor past performance. We have
Your responses to the attached Past Performance Evaluatio Engineers evaluation team in the process of selecting a conthe attached <i>Design and Construction Experience Form</i> for information, please correct it in the margin or in the space performance Evaluation Questionnaire. When you mail or Questionnaire to the Corps, it is important that you also train	tractor. The Corps requests that you review accuracy: If you disagree with any of the provided for comments at the end of the Past fax the Past Performance Evaluation

Please submit the completed evaluation directly to the Corps of Engineers: **Do not fax or mail a copy to us.** FAR 15.306 (e)(4) prohibits the release of the names of the persons providing the responses. The Corps assures you that complete confidentiality will be maintained by the Government. Kindly complete the questionnaire immediately and fax or mail to the following address:

U.S. Army Engineer District, Kansas City ATTN: CENWK-CT-C/Earl Smith 601 East 12th Street Kansas City, Missouri 64016-2896

Fax: 816-426-5777

The Corps will not consider questionnaires received after the proposal due date. If you have questions regarding the attached questionnaire, or require assistance, please contact Mr. Earl Smith at (816) 983-3846. Thank you for your assistance.

Sincerely.....

OFFEROR:	_	PAGE	_OF
PAST PERFORMANCE	EVALUATION - C	CONSTRU	JCTION
Please mail directly to the U.S. Army Conto 816-426-5777, ATTN: Mr. Earl Smith.		sed addressed	envelope or fax
1. Contractor Name, Address & telephone n	number: (To be filled in by O	fferor.)	
2. Type of Contract (mark all that apply): Construction Des Fixed Price Cos	ign Design Bu t Reimbursement Ot	ild her (Specify)	
3. Title of Project, Customer & Contract Nu 4. Description of Work, including that work	performed by the Contractor:	(See attached	"Design and
Construction Experience Form). Refere	nces please check for accura	cy.	
5. Complexity of Work: High M	id	Routine	
6. Location of Work (City and State): (See	attached Design and Constru	iction Experie	nce Form)
7. Date of Award: (See attached Design and	nd Construction Experience	Form)	
8. Project Status: Active	(provide percent comple Complete		etion date)
9. Name, address, telephone number and far	x number of person completing	g this form:	

	uality achieved an
ccurate, comple	te and submitted i
ccurate, comple	te and submitted i
ecurate, comple	te and submitted in
curate, comple	te and submitted i
ccurate, comple	te and submitted i
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<u>-</u>	
ice problems w	ithout extensive
	nce problems w

Excellent Management Above Average Management Average Management Below Average Management None Of The Above Apply Remarks:	coordinate subc	contractors, supp	oliers, and the lab
Excellent Management Above Average Management Average Management Below Average Management None Of The Above Apply	coordinate subc	contractors, supp	oliers, and the lab
Above Average Management Average Management Below Average Management None Of The Above Apply			
Average Management Below Average Management None Of The Above Apply			
Below Average Management None Of The Above Apply			
None Of The Above Apply			
CUSTOMER SATISFACTION (PLEASE	EXPLAIN RA	ATINGS):	
	1 24		
14. To what extent were the end users satisfie		G (2)	0.1.1.1.0
7 1 17 1 00 1 0 1	Quality?	Cost?	Schedule?
Exceptional Level of Satisfaction			
Above Average Level of Satisfaction			
Average level of Satisfaction			
Below Average Satisfaction			
None of the Above Apply			
Remarks:			
15. If given the opportunity, would you work Yes No Not		C	

TIMELINESS OF PERFORMANCE:
16. To what extent did the contractor meet the task order schedules? Completed work substantially ahead of schedule, based on the original schedule, with time extensions allowed for modifications. Completed work within schedule, with no time extensions required as a result of contractor's actions, or delays Completed work, with minor time extensions required.
Completed work, with major time extensions required. None of the above apply.
17. OTHER REMARKS: Please provide other information related to the contractor's performance you would like the Government to consider. Include any comments on the "Project Example Form" the information in items 1-10 of this questionnaire. Other information that the Corps appreciates includes: the Contractor's selection and management of subcontractors, effectiveness of their small's disadvantaged business subcontracting plan; the Contractor's flexibility in dealing with contract challenges and unforseen conditions; the Contractor's overall concern for the customer's interests; are
any awards received by the example project.

	1 uge 20 01 7
OFFEROR:	PAGEOF
PAST PERFORMANCE EVAI	LUATION - DESIGN
Please mail this questionnaire directly to the Kansas City the enclosed pre-addressed envelope or fax to 816-426-577	
1. Design Firm/Name & Address (City and State): (To be file	led in by Offeror)
2. Type of Contract (mark all that apply): (To be filled in by	Offeror)
Design (A-E) Design-Build Oth	er (Specify)
3. Title of Project/Contract Number: (To be filled in by Offe	eror)
4. Description of Work, <u>including that performed by the Offe</u> Construction Experience Form) References please check to	_ ·
5. Location of Work: (See attached Design and Construction	on Experience Form)
6. Date of Award: (See attached Design and Construc	ction Experience Form)
7. Status: Active (provide percent complete) Complete (provide completion date)	
8. Name, address and telephone number of Contracting Offic Design and Construction Experience Form.	er's Technical Representative: See attached
9. Name, phone number, and job title of person completing	g questions 10 through 16:

OFFEROR:	PAGEOF
QUALITY OF PRODUCT/SERVICE:	
10. Evaluate the design firm's performance in coroverall technical expertise demonstrated.	mplying with contract requirements, quality achieved and
Excellent Quality	
Above Average Quality	
A suggest Oscalitate	
Below Average Quality	
None Of The Above Apply	
Remarks:	
Above Average Quality Average Quality Below Average Quality None Of The Above Apply	itted in a timely manner?
Remarks:	
delays and project cost increases?	lve and/or resolve design issues while minimizing time
Excellent Ability	
Above Average Ability	
Average Ability	
Below Average Ability	
None Of The Above Apply	

No. 12 Remarks:				
13. How well did the completed design meet usability, aesthetics and construction budget?		expectations wi	th regard to fund	ctiona
Excellent Quality				
Above Average Quality				
Average Quality				
Below Average Quality				
None of the Above Apply				
CUSTOMER SATISFACTION (PLEASE	EXPLAIN YO	OUR RATING	<u>S):</u>	
14. To what extent were the end users satisfie	d with the desi	gn firm's:		
	Quality?	Cost?	Schedule?	
Exceptional Level of Satisfaction				
Above Average Level of Satisfaction				
Average level of Satisfaction Below average level of Satisfaction				
Relow average level of Satisfaction				
None of the Above Apply				

OFFEROR:	PAGE	OF
15. If given the opportunity, would you work with this contractor again	? Please Exp	olain:
TIMELINESS OF PERFORMANCE:		
16. To what extent did the contractor meet the task order schedules?		
Completed work substantially ahead of schedule, based on the original to the control of the cont	ginal	
schedule, with time extensions allowed for modifications. Completed work within schedule, with no time extensions required	d ac a	
result of contractor's actions, or delays	u as a	
Completed work, with minor time extensions required.		
Completed work, with major time extensions required.		
None of the above apply.		
Demodes		
Remarks:		
		
17 OTHER REMARKS. Please was the name in day of this mass and the		a 4a maayida a4han
17. OTHER REMARKS: Please use the remainder of this page or the information related to the contractor's performance. This may include the contractor's performance.		
this questionnaire provided by the Contractor (items 1-10), the Contrac		
subcontractors, effectiveness of their small/small disadvantaged business	ss subcontrac	ting plan, flexibility
in dealing with contract challenges, their overall concern for the Govern	nment's intere	est (if applicable),
project awards received, etc.		

DESIGN & CONSTRUCTION EXPERIENCE FORM

Name of Offeror or Joint Venture Offeror: If experience is for a firm that is different from the Offeror, name of that firm:			
1. Complete name of the Customer (Government agency, commercial firm, or	other organization):		
2. Complete Address			
3. Contract number or other reference	4. Date of contract		
5. Performance period of contract	6. Date work was completed		
7. Contract value, estimated value, or target cost	8. Location of work (country, state or province, county, city)		
9. Technical point of contact (name, title, address, telephone no. and email address)	10. Contracting or purchasing point of contract and alternate (name, title, address, telephone no. and email address)		
11. Description of Project, it's complexities, and your firm's role, key trades into of the project that make it relevant to this acquisition. If applicable, include Sub Owned Business) and actual attainment. Attach an explanation of any perform any litigation, pending, on-going, or completed. Use a continuation sheet, if n	ocontracting goals(Small, Small Disadvantaged and Women nance problems or conflicts with the customers. Describe		
12. Current status of contract: Work completed, no further action pending or underway Work completed, litigation pending or underway Work completed, routine administrative action pending or underwa Terminated for convenience Work completed, claims negotiations pending or underway Terminated for default Other (explain)	у		

1. SOURCE SELECTION PROCESS

All offers received in response to this solicitation will be evaluated in accordance with informal source selection procedures. The principal objective of this process is to select the Offeror that presents the overall Best Value to the Government, price and other evaluation factors considered (the Best Value). The right is reserved to accept other than the lowest price offers and to reject any or all offers. Award may be made to the superior proposal, regardless of cost or price, provided that price is determined to be reasonable. The Source Selection Process is designed to ensure the impartial, equitable, and comprehensive evaluation of all technically acceptable, responsible proposals received in response to this solicitation.

a. Source Selection Organization.

The source selection organization for the subject acquisition is established as a separate organization and management chain of command. The organization consists of a Source Selection Authority (SSA) and a Source Selection Evaluation Board (SSEB). The SSEB is comprised of separate Technical Evaluation and Price Evaluation teams. The organization is designed to ensure active ongoing involvement of appropriate contracting, technical, logistics, legal, price analysis, small business, and other functional staff management expertise.

b. Source Selection Procedures

The source selection procedures will begin with an initial review of proposals and continues with a technical and price evaluation conducted by the SSEB. The SSEB will evaluate the proposals based solely on the evaluation criteria identified in paragraph: Evaluation Factors, below. The Technical Evaluation Team will rate Evaluation Factors 1 and 2 of each Proposal (Management Plan and Past Performance). The Price Evaluation Team will subjectively evaluate each proposal for price reasonableness. This price analysis is a review of the overall price to determine if it is realistic for the work to be performed and does not reflect an imbalance between line items.

The results of the SSEB evaluations will be presented to the SSA, who will rank the proposals based on the Best Value to the Government, price and other factors considered. The Government intends to award without discussions. The SSA will either make the final source selection decision or determine whether it is appropriate to engage in clarifications or communication prior to establishment of a competitive range, or to establish a competitive range and conduct discussions with offerors included in the competitive range. All communications leading to establishment of the competitive range will be conducted in accordance with FAR Part 15.306b.

If a competitive range is established, discussions will be conducted with offerors who are included in the competitive range. After conclusion of discussions and receipt of final revised technical proposals, the SSEB will complete the evaluation and establish final ratings. Results of the final technical ratings will be presented to the SSA, who will rank the proposals based on

the Best Value to the Government, price and other factors considered. The SSA will then make the final source selection decision. If appropriate, the SSA will apply the tradeoff process in the Best Value Continuum.

The proposals received in response to this RFP will be evaluated utilizing a rating system to select the most advantageous proposal. To be considered acceptable, each offeror shall specifically address each of the evaluation factors listed below. Sufficient detail shall be provided, citing specific data as may be required, such that the proposal may be adequately evaluated. The proposal must show clearly that the offeror has an understanding of the work tasks required and has the capability and responsibility to successfully execute the work.

Section 00110 contains instructions regarding Proposal format and content: The Government is not responsible for information overlooked during the evaluation that is not located in the appropriate section of the Proposal. To ensure that evaluation credit is appropriately received for proposal material submitted, do not incorporate by reference, documents not contained in the proposal. In developing subfactor ratings, Proposal clarity and offeror compliance with solicitation instructions regarding proposal content, format and page limits will be considered.

2. BASIS FOR AWARD

Offerors are reminded to include their best technical and price terms in their initial offer and not to assume that they will have an opportunity to participate in discussions or be asked to submit a revised offer. The Government intends to select, without discussions, the responsible offeror whose proposal conforms to the solicitation requirements and is determined to represent the Best Value to the Government, in accordance with the following relationship between price and technical merit: The technical evaluation factors Management Plan and Past Performance), when combined, are significantly more important than price. The closer the total evaluated technical scores of acceptable proposals are to one another, the greater will be the importance of price in making the selection determination.

3. EVALUATION FACTORS AND RELATIVE WEIGHTS OF FACTORS AND SUBFACTORS

Evaluation factors are listed below. In developing the ratings for Factors 1 and 2, the Technical Evaluation Team will focus on how well the offerors complied with the Section 00110 PROPOSAL CONTENT requirements and instructions. The completeness, expertise, accuracy, consistency, conciseness, understanding of work performance and technical requirements, and the relevance of information provided will be important be considerations.

FACTOR 1 – Performance Capability (Most important)

a. Specific Personnel Experience: Experience of Principal Managers, Designers and Technical Personnel who will be directly responsible for the day-to-day design and

construction activities. These are key individuals, in accordance with contract clause "Key Personnel, Subcontractors and Outside Associates or Consultants" (See Section 00800). The relevancy of specific personnel experience to the proposed acquisition is most important: experience with projects and facilities that are similar and closely related in type size and complexity will be given more weight than experience with the other types of facilities and projects. Education and training, professional registration, and familiarity with local conditions will also be considered by the Technical Evaluation Team. Design-Build projects for the Government, particularly the Corps of Engineers, will be considered relevant. Specific Design Personnel experience must be within the three (3) year period prior to the Proposal due date. Specific Construction Personnel experience must be within the five (5) year period prior to the Proposal due date. (Most Important Subfactor).

- b. Management Plan: Management Plan: Organization; technical approach; preliminary design and construction schedule; and quality control, subcontracting and management strategies. Evaluation will focus on information requirements discussed in Section 110, paragraph PROPOSAL CONTENT. (Equal in Importance to Subfactor 1.a.).
- c. Offeror Design Experience: <u>Design</u> of similar and closely related projects (type of facility, size and complexity) <u>within the past three (3) years</u>. Design-Build projects for the Government, particularly the Corps of Engineers, will be considered relevant. Also evaluated, if applicable, will be utilization of small, small disadvantage and women owned businesses. (Significantly less important than Subfactor 1.b.)
- d. Offeror Construction Experience: <u>Construction</u> of similar and closely related projects (type of facility, size and complexity) <u>within the past five (5) years</u>. Design-Build projects for the Government, particularly the Corps of Engineers, will be considered relevant. Also evaluated, if applicable, will be utilization of small, small disadvantage and women owned businesses. (Equal in importance to Subfactor 1.c.).

FACTOR 2 – Past Performance (Less Important than Factor 1)

2a. Past Performance: Design

- 2.a.1 Customer satisfaction (Most important)
- 2.a.2 Quality, Function and Service (Less important than 2.a.1)
- 2.a.3 Timeliness of performance (Equal in importance to 2.a.2)

2.b. Past Performance: Construction (Equal importance to 2.a)

- 2.b.1 Customer satisfaction (Most Important & equal to 2.a.1)
- 2.b.2 Quality, Function and Service (Less important than 2.b.1. and equal to 2.a.2)
- 2.b.3 Timeliness of performance (Equal to 2.b.2.)

In the course of evaluating offeror past performance, the Source Selection Evaluation Board may contact references listed in the Design and Construction Experience Forms. Offerors are therefore advised to make certain that reference employer and telephone numbers are correct on the Design and Construction Experience Forms. As explained in Section 00110, the government may utilize past performance information from other sources.

In developing the past performance ratings, evaluators will consider the relevancy of the available past performance information to the proposed acquisition: information for projects that are similar in type size and complexity will be given more weight than information for projects that are closely related in type size and complexity, which will be given more weight than past performance information for other types of projects. Design-Build projects for the Government, particularly the Corps of Engineers, will be considered relevant. Relevancy includes: (1) similarity of the work in terms of type, size and complexity; (2) Key personnel, branch offices, and subcontactors involved in the example project(s), and how those personnel and offices will be involved with the subject acquisition; (3) the firm's role in the subject acquisition and past performance in similar roles; (4) the age of any adverse past performance information and whether more recent information indicates improvement; and (5) credibility, detail and source of the past performance information.

In the case of an offeror without a record of relevant past performance or for whom information on past performance is not available, the offeror will not be evaluated favorably or unfavorably and will be assigned a neutral rating. During the ranking process, the SSA may also consider past performance information in evaluating overall risk associated with a particular offeror.

If the Government does not receive at least three (3) past performance evaluations for at least three (3) different design project examples, from at least three (3) different references, neutral (satisfactory) ratings will be assigned for subfactors 2.a.1, 2.a.2 and 2.a.3.

If the Government does not receive at least three (3) past performance evaluations for at least three (3) different construction project examples, from at least three (3) different references, neutral (satisfactory) ratings will be assigned for subfactors 2.b.1, 2.b.2 and 2.b.3.

The past performance subfactor ratings will be based on responses by the references to specific Past Performance Evaluation Form questions; however, the evaluators will factor information from other sources into the subfactor ratings.

At no time during this process, nor during the debriefing, nor after award, will the names of the individuals providing reference information about an offeror's past performance be revealed to the offerors or to any other party. Offerors may be afforded the opportunity to respond to adverse comments made by references in accordance with guidelines identified in FAR Part 15.3. In this case, comments will be extracted and provided to the offeror. Copies of the questionnaires will not be furnished to the offeror and will remain confidential.

During the ranking process the SSA may also consider past performance information in evaluating overall risk associated with a particular offeror.

FACTOR 3 – Price (Significantly less important and Factor 1 and Factor 2 combined):

- b. Price will not be point-scored, but will be subjectively evaluated by the Price Evaluation Team. Price will be used as a discriminator in the event that two or more proposals are rated equally based on evaluation of the Technical Factors. The closer the total evaluated technical scores of acceptable offers are to one another, the greater will be the importance of price in making the selection determination.
- c. The Price Proposal Schedule (Volume 2) submitted in response to this solicitation will not be point scored but will be subjectively evaluated for reasonableness over the life of the contract. In the event, during the course of the analysis, the Price Evaluation Team has reason to question the reasonableness of a price proposal, or has reason to believe there is unbalancing in the price proposal, the PET may conduct such additional reasonable analysis as it requires in order to complete a thorough price analysis. Because the evaluation of the price proposal will represent a portion of the total evaluation, it is possible that an offeror might not be selected because of an unbalanced or an unreasonable price proposal.
- d. The evaluated price information will be reported to the SSA. The SSA will utilize the technical ratings and the price evaluations in preparing its overall ranking of the proposals and as to the Best Value determination for selection of successful offerors.

4. DEBRIEFING

In accordance with FAR 15.505 <u>Preaward Debriefing of Offerors</u>, and FAR 15.506 <u>Postaward Debriefing of Offerors</u>, the offeror should be aware of the following.

PRE-AWARD DEBRIEFING OF OFFERORS (FAR 15.505)

Offerors excluded from the competitive range or otherwise excluded from the competition before award may request a debriefing before award (10 U.S.C. 2305(b)(6)(A) and 41. U.S.C. 253b(f)-(h)).

- (a)(1) The offeror may request a preaward debriefing by submitting a written request for debriefing to the Contracting Officer within 3 days after receipt of the notice of exclusion from the competition.
- (2) At the offeror's request, this debriefing may be delayed until after award. If the debriefing is delayed until after award, it shall include all information normally provided in a postaward debriefing (see 15.506(d)). Debriefings delayed pursuant to this paragraph could affect the timeliness of any protest filed subsequent to the debriefing.
- (3) If the offeror does not submit a timely request, the offeror need not be given either a preaward or a postaward debriefing. Offerors are entitled to no more than one debriefing for each proposal.

- (b) The Contracting Officer shall make every effort to debrief the unsuccessful offeror as soon as practicable, but may refuse the request for a debriefing if, for compelling reasons, it is not in the best interests of the Government to conduct a debriefing at that time. The rationale for delaying the debriefing shall be documented in the contract file. If the Contracting Officer delays the debriefing, it shall be provided no later than the time postaward debriefings are provided under 15.506. In that event, the Contracting Officer shall include the information at 15.506(d) in the debriefing.
- (c) Debriefings may be done orally, in writing, or by any other method acceptable to the Contracting Officer.

The Contracting Officer should normally chair any debriefing session held. Individuals who conducted the evaluations shall provide support.

At minimum, preaward debriefings shall include--

- (1) The agency's evaluation of significant elements in the offeror's proposal;
- (2) A summary of the rationale for eliminating the offeror from the competition; and
- (3) Reasonable responses to relevant questions about whether source selection procedures contained in the solicitation, applicable regulations, and other applicable authorities were followed in the process of eliminating the offeror from the competition.

Preaward debriefings shall not disclose--

The number of offerors;

The identity of other offerors;

The content of other offerors' proposals;

The ranking of other offerors;

The evaluation of other offerors; or

Any of the information prohibited in 15.506(e).

An official summary of the debriefing shall be included in the contract file.

POSTAWARD DEBRIEFING OF OFFERORS FAR 15.506

(a)(1) An offeror, upon its written request received by the agency within 3 days after the date on which that offeror has received notification of contract award in accordance with 15.503(b), shall be debriefed and furnished the basis for the selection decision and contract award.

- (2) To the maximum extent practicable, the debriefing should occur within 5 days after receipt of the written request. Offerors that requested a postaward debriefing in lieu of a preaward debriefing, or whose debriefing was delayed for compelling reasons beyond contract award, also should be debriefed within this time period.
- (3) An offeror that was notified of exclusion from the competition (see 15.505(a)), but failed to submit a timely request, is not entitled to a debriefing.
- (4)(i) Untimely debriefing requests may be accommodated.
- (ii) Government accommodation of a request for delayed debriefing pursuant to 15.505(a)(2), or any untimely debriefing request, does not automatically extend the deadlines for filing protests. Debriefings delayed pursuant to 15.505(a)(2) could affect the timeliness of any protest filed subsequent to the debriefing.
- (b) Debriefings of successful and unsuccessful offerors may be done orally, in writing, or by any other method acceptable to the Contracting Officer.
- (c) The Contracting Officer should normally chair any debriefing session held. (Individuals who conducted the evaluations shall provide support.)

At a minimum, the debriefing information shall include--

- (1) The Government's evaluation of the significant weaknesses or deficiencies in the offeror's proposal, if applicable;
- (2) The overall evaluated price (including unit prices), and technical rating, if applicable, of the successful offeror and the debriefed offeror, and past performance information on the debriefed offeror;
- (3) The overall ranking of all offerors, when any ranking was developed by the agency during the source selection;
- (4) A summary of the rationale for award;
- (5) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror; and
- (6) Reasonable responses to relevant questions about whether source selection procedures contained in the solicitation, applicable regulations, and other applicable authorities were followed.
- (e) The debriefing shall not include point-by-point comparisons of the debriefed offeror's proposal with those of other offerors. Moreover, the debriefing shall not reveal any information

prohibited from disclosure by 24.202 or exempt from release under the Freedom of Information Act (5 U.S.C. 552) including--

(1) Trade secrets;

Privileged or confidential manufacturing processes and techniques;

- (3) Commercial and financial information that is privileged or confidential, including cost breakdowns, profit, indirect cost rates, and similar information; and
- (4) The names of individuals providing reference information about an offeror's past performance.
- (f) An official summary of the debriefing shall be included in the contract file.

SECTION 00600 Representations & Certifications

CLAUSES INCORPORATED BY REFERENCE:

52.203-11	Certification And Disclosure Regarding Payments To Influence	APR 1991
	Certain Federal Transactions	
252.209-7001	Disclosure of Ownership or Control by the Government of a	MAR 1998
	Terrorist Country	
252.227-7028	Technical Data or Computer Software Previously Delivered to the	JUN 1995
	Government	

CLAUSES INCORPORATED BY FULL TEXT

52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

- (a) The offeror certifies that --
- (1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to –
- (i) Those prices,
- (ii) The intention to submit an offer, or
- (iii) The methods of factors used to calculate the prices offered:
- (2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and
- (3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.
- (b) Each signature on the offer is considered to be a certification by the signatory that the signatory --
- (1) Is the person in the offeror's organization responsible for determining the prices offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision; or
- (2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provison ______ (insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);
- (ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and
- (iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision.

(c) If the offeror deletes or modifies subparagraph (a)(2) of this provision, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

- (a) Definition. Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.
- (b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it () is a women-owned business concern.

(End of provision)

- 52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)
- (a)(1) The Offeror certifies, to the best of its knowledge and belief, that--
- (i) The Offeror and/or any of its Principals--
- (A) Are () are not () presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;
- (B) Have () have not (), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and
- (C) Are () are not () presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(B) of this provision.
- (ii) The Offeror has () has not (), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.
- (2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

- (c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.
- (d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- (e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.215-6 PLACE OF PERFORMANCE (OCT 1997)

(a) The offeror or respondent, in the performance of any contract resulting from this solicitation, () intends, () does not intend [check applicable block] to use one or more plants or facilities located at a different address from the address of the offeror or respondent as indicated in this proposal or response to request for information.

(b) If the offeror or respondent checks "intends" in paragraph (a) of this provision, it shall insert in the following

spaces the required information:

Place of performance (street Name and address of owner and address, city, state, county, zip operator of the plant or facility code) if other than offeror or respondent

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 2001) ALTERNATE I (OCT 2000) & ALTERNATE II (OCT 2000)

- (a)(1) The North American Industry Classification System (NAICS) code for this acquisition is NAICS code). (insert
- (2) The small business size standard is (insert size standard).
- (3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.
- (b) Representations. (1) The offeror represents as part of its offer that it () is, () is not a small business concern.
- (2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it () is, () is not a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a women-owned small business concern.			
(4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a veteran-owned small business concern.			
(5) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that it () is, () is not a service-disabled veteran-owned small business concern.			
(6) (Complete only if offeror represented itself as small business concern in paragraph (b)(1) of this provision). The offeror represents, as part of its offer, that			
(i) It () is, () is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR Part 126; and			
(ii) It () is, () is not a joint venture that complies with the requirements of 13 CFR Part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. (The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:) Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.			
(7) (Complete if offeror represented itself as disadvantaged in paragraph (b)(2) of this provision.) The offeror shall check the category in which its ownership falls:			
() Black American.			
() Hispanic American.			
() Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).			
() Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).			
() Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).			
(c) Definitions. As used in this provision			
Service-disabled veteran-owned small business concern-			
(1) Means a small business concern			
(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any			

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled

veterans; and

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

Small business concern means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

Veteran-owned small business concern means a small business concern--

- (1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and
- (2) The management and daily business operations of which are controlled by one or more veterans.

Women-owned small business concern means a small business concern --

- (1) That is at least 51 percent owned by one or more women; in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and
- (2) Whose management and daily business operations are controlled by one or more women.
- (d) Notice.
- (1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.
- (2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--
- (i) Be punished by imposition of fine, imprisonment, or both;
- (ii) Be subject to administrative remedies, including suspension and debarment; and
- (iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

52.219-22 SMALL DISADVANTAGED BUSINESS STATUS (OCT 1999)

- (a) General. This provision is used to assess an offeror's small disadvantaged business status for the purpose of obtaining a benefit on this solicitation. Status as a small business and status as a small disadvantaged business for general statistical purposes is covered by the provision at FAR 52.219-1, Small Business Program Representation.
- (b) Representations.
- (1) General. The offeror represents, as part of its offer, that it is a small business under the size standard applicable to this acquisition; and either--
- ___ (i) It has received certification by the Small Business Administration as a small disadvantaged business concern consistent with 13 CFR 124, Subpart B; and

- (A) No material change in disadvantaged ownership and control has occurred since its certification;
- (B) Where the concern is owned by one or more disadvantaged individuals, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at $13 \text{ CFR} \ 124.104(c)(2)$; and
- (C) It is identified, on the date of this representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration(PRO0Net); or
- ___ (ii) It has submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.
- (2)___ For Joint Ventures. The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements at 13 CFR 124.1002(f) and that the representation in paragraph (b)(1) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture: ______.]
- (c) Penalties and Remedies. Anyone who misrepresents any aspects of the disadvantaged status of a concern for the purposes of securing a contract or subcontract shall:
- (1) Be punished by imposition of a fine, imprisonment, or both;
- (2) Be subject to administrative remedies, including suspension and debarment; and
- (3) Be ineligible for participation in programs conducted under the authority of the Small Business Act.

(End of provision)

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

- (a) [] It has, [] has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;
- (b) [] It has, [] has not, filed all required compliance reports; and
- (c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)

- (a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8, 1995.
- (b) By signing this offer, the offeror certifies that--
- (1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic

Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or

- (2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)
- [] (i) The facility does not manufacture, process or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);
- [] (ii) The facility does not have 10 or more full-time employees as specified in section 313.(b)(1)(A) of EPCRA 42 U.S.C. 11023(b)(1)(A);
- [] (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);
- [] (iv) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or
- [] (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

52.226-2 HISTORICALLY BLACK COLLEGE OR UNIVERSITY AND MINORITY INSTITUTION REPRESENTATION (MAY 2001)

(a) Definitions. As used in this provision--

Historically black college or university means an institution determined by the Secretary of Education to meet the requirements of 34 CFR 608.2. For the Department of Defense, the National Aeronautics and Space Administration, and the Coast Guard, the term also includes any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

Minority institution means an institution of higher education meeting the requirements of Section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1067k, including a Hispanic-serving institution of higher education, as defined in Section 316(b)(1) of the Act (20 U.S.C. 1101a)).

- (b) Representation. The offeror represents that it--
- () is () is not a historically black college or university;
- () is () is not a minority institution.

(End of provision)

52.227-6 ROYALTY INFORMATION (APR 1984)

- (a) Cost or charges for royalties. When the response to this solicitation contains costs or charges for royalties totaling more than \$250, the following information shall be included in the response relating to each separate item of royalty or license fee:
- (1) Name and address of licensor.
- (2) Date of license agreement.

- (3) Patent numbers, patent application serial numbers, or other basis on which the royalty is payable.
- (4) Brief description, including any part or model numbers of each contract item or component on which the royalty is payable.
- (5) Percentage or dollar rate of royalty per unit.
- (6) Unit price of contract item.
- (7) Number of units.
- (8) Total dollar amount of royalties.
- (b) Copies of current licenses. In addition, if specifically requested by the Contracting Officer before execution of the contract, the offeror shall furnish a copy of the current license agreement and an identification of applicable claims of specific patents.

(End of provision)

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

- (a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.
- (b) Representation. The Offeror represents that it:
- ____ (1) Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.
- ____ (2) Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.
- (c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

NOTICE TO OFFERORS

I)

If your firm is a large business and your bid exceeds \$500,000 or more for services or \$1,000,000 for construction, your attention is directed to the following provisions contained in the solicitation:

- 52.219-8, Utilization of Small, Small Disadvantaged and Women-Owned Business Concerns (Alternate I) 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (Alternate
 - 52.219-16, Liquidated Damages Small Business Subcontracting Plan 52.226-1, Utilization of Indian Organizations and Indian-Owned Economic Enterprises

For your information, the United Army Corps of Engineers considers the following goals reasonable and achievable for fiscal year and during the performance of the resultant contract.

- a. 61.4% of planned subcontracting dollars will be placed with all small business concerns.
- b. 9.1% of planned subcontracting dollars will be placed with those small business concerns owned and controlled by socially and economically disadvantaged individuals.
- c. 5% of planned subcontracting dollars will be placed with those small business concerns owned and controlled by women.
- d. 3% of planned subcontracting dollars will be placed with those small business concerns owned and controlled by service disabled veterans.
- e. There are no established goals for planned subcontracting dollars placed with those small business concerns owned and controlled by certified Hubzone concerns, small business concerns owned and controlled by veterans, and Historic Black Colleges and/or Minority Institutions, however, subcontracting with these concerns is highly encouraged.

Goals included in any proposed subcontracting plan should be at least equal to those indicated above. If lesser goals are proposed, you must substantiate how the proposed plan represents the firm best effort to comply with the terms and conditions of the solicitation. Offerors are highly encouraged to become familiarize with the intent of the solicitation provisions and the elements of the subcontracting plan.

The subcontracting plan must contain, at a minimum, the elements set forth in solicitation provision 52.219-9. Proposed plans will be reviewed to ensure the plan represents the firm's best efforts to maximize subcontracting opportunities for small, small disadvantaged and women-owned businesses. Subcontracting plans require Contracting Officer approval prior to contract award.

Should the selected offeror fail to submit an acceptable subcontracting plan within the time limit prescribed by the Contracting Officer, the offeror will be considered ineligible for award. The approved subcontracting plan (to include goals) will become a material part of the contract. An example of a format of a subcontracting plan is attached for your information. The attached plan is an example only and should not be construed as the only acceptable subcontracting plan format. Any format will be acceptable provided the plan addresses each element as required by the Federal Acquisition Regulations and its supplements.

Should you have any questions or need assistance in developing your plan, please contact the assigned Contract Specialist or the District's Deputy for Small Business at 816-983-3927 or fax your inquiries to 816-426-2979.

SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN **EXAMPLE**

		DATE:
CONTRACTOR:		
ADDRESS:		
PHONE NO:		
PROJECT TITLE:		
SOLICITATION NO:		
CONTRACT NO:		
1. In accordance with the contract clauses at 52.219-8 Subcontracting Plan for Small, Small Disadvantaged,		
2. Subcontracting goals for this contract:		
a. Total contract amount is \$		
b. Total dollars planned to be subcontracted (to al	ll types of businesses): \$	·
Type of Subcontractor	Amount Planned to be Subcontracted	Percentage of Subcontracted Dollars
Large Business		%
Small Businesses		%
- Small Disadvantaged*		%
- Small Women-Owned		%
- Small Service Disabled Veterans Owned		%
- Small Veteran Owned		%
HubZone Concern		%
Historical Black College and Minority Institution		%
Total		100%
*NOTE: Women-owned businesses are not considered awards to women-owned businesses in your calculation disadvantaged business. 3. The principal items or areas we will subcontract under the principal items or areas.	ons unless the firm meets the defined on the definition of the def	s. Do not include subcontract nition of a small nstruction contractors
remember to include materials/supplies when develop Section number):	nng pian. Also, list each subcon	tracted task by Division and
a. Of the items or areas stated in 3; we plan to	o subcontract the following to Sr	mall Businesses:

Businesses:	Of the items of areas stated in 3.a; we plan to subcontract the following to Small Disadvantaged
c. Businesses:	Of the items or areas stated in 3.a; we plan to subcontract the following to Small Women-Owned
	Of the items or areas stated in 3.a; we plan to subcontract the following to Small Service Disabled wned Businesses:
e. Businesses:	Of the items or areas stated in 3.a; we plan to subcontract the following to Small Veteran-Owned
f.	Of the items or areas stated in 3; we plan to subcontract the following to Hub Zone concerns:
g. Minority In	Of the items or areas stated in 3; we plan to subcontract the following to Historically Black Colleges and stitutions:
	a description of the method your firm used to develop the subcontracting goals in paragraph 2:
your goals,	osts were () were not () used in establishing subcontracting goals. **If indirect costs are included in furnish a description of the method used to determine the proportionate share of indirect costs to be th (i) small business concerns (ii) small disadvantaged business concerns and (iii) women-owned.**
6. The follo	wing individual will administer this Subcontracting Plan on behalf of (name of contractor):
Name:	Title:
Address:	
Telephone:	
The afo	prementioned individual's specific duties will include, but is not limited to:

- a. Developing and maintaining source lists of small, small disadvantaged and women-owned small business concerns. Sources used are the Small Business Administration's Procurement Automated Source System (PASS), the National Minority Purchasing Council Vendor Information Service, Minority Business Development Agency, US Department of Commerce, Local Minority Business Development Centers, Economic Development Centers, and National Center for American Indian Enterprise Development.
- b. Assuring the inclusion of small, small disadvantaged, and women-owned small business concerns in all solicitations for products or services which they are capable of providing; and ensuring that all solicitations are structured to permit the maximum possible participation by small, small disadvantaged and women-owned small business concerns.
- c. Establishing and maintaining records of all subcontract awards to ensure appropriate documentation of non-selection of bids submitted by a small, small disadvantaged business, or women-owned small business concerns.
- d. Preparing and submitting the Subcontracting Report for Individual Contracts (SF 294) and the Summary Subcontract Report (SF 295) in accordance with instructions provided, and coordinating and preparing for all compliance reviews by Federal agencies.
- e. Promoting activities necessary to further the intent of the subcontracting plan. Activities include motivational training of purchasing personnel; attendance at workshops, seminars and trade fairs conducted by or on behalf of small business and/or small disadvantaged and/or women-owned small business concerns; and general cooperation with members of the small, small disadvantaged and women-owned small business concerns or their representatives.
- 7. The following steps will be taken to ensure that small, small disadvantaged, and women-owned small business concerns receive notice of and have an equitable opportunity to compete for intended awards of subcontracts and/or purchase orders for the products and/or services describe in paragraph 4 above:
- a. Sources will be requested through SBA's PASS system, business development organizations, minority and small business trade associations and at small, minority and women-owned small business procurement conferences; sources will be contacted; and bidding materials will be provided to all responding parties expressing an interest.
- b. The firm will conduct and maintain internal motivational training to guide and encourage purchasing personnel to maintain source lists and guides to small, small disadvantaged, and women-owned small business concerns. Purchasing activities will be monitored to ensure sufficient time is allowed for interested offerors to prepare bids and to ensure continuous compliance with the approved Subcontracting Plan.
- 8. [Name of contractor] agrees that the clause entitled "Utilization of Small, Small Disadvantaged and Women-Owned Business Concerns" will be included in all subcontracts that offer further subcontracting opportunities. All subcontractors, except small business concerns, who receive subcontracts in excess of \$500,000 (\$1,000,000 in the case of construction) will be required to adopt a plan similar to this one. Such plans will be reviewed to assure that all minimum requirements of an acceptable subcontracting plan have been satisfied.

The acceptability of proposed goals shall be determined on a cases-by-case basis depending on the supplies/services involved, the availability of potential small, small disadvantaged, and women-owned subcontractors, and prior experience. Once approved and implemented, plans will be monitored through the submission of periodic reports or, as time and availability of funds permit, periodic visits to subcontractors facilities to review applicable records and subcontracting program progress.

9. The Firm agrees to submit periodic reports and cooperate in any studies or surveys required by the Contracting Activity or Small Business Administration to determine the extent of the firm compliance with the subcontracting plan.

- 10. (Name of Contractor) agrees to maintain at least the following types of records to document compliance with the Subcontracting Plan:
- a. The names of all organizations, agencies, and associations contacted for small, small disadvantaged, and women-owned small business sources, along with records of attendance at conference, seminars and trade fairs where additional sources were developed.
- b. Source lists, guides, and other data identifying small business concerns, small disadvantaged business concerns and women-owned small business concerns.
- c. Records of subcontracts award in excess of \$100,000 will demonstrate how small business concerns, small disadvantaged business concerns and women-owned business concerns were solicited or provide an explanation as to why these business concerns were not considered for subcontracting opportunities.
- d. Records of subcontract award data to include subcontractor's name and address, to be kept on a contract-by-contract basis.
- e. Minutes of internal motivational and training meetings held for the guidance and encouragement of purchasing personnel, and records of all monitoring activities performed for compliance evaluation.
- f. Copies of SF 294 and SF 295 showing date and place of filing and copies of all other reports or results of reviews conducted by the contracting agency or other interested agencies of the Federal government to monitor our compliance with this Subcontracting Plan.
- 11. (*Name of Contractor*) will submit a SF 295, Summary Subcontract Report, on Corps of Engineers projects only. The SF 295 shall be completed and distributed in accordance with the Corps of engineers Supplemental Instructions. (*Name of Contractor*) will not report Corps of Engineers projects through any other Agency unless authorized by the Contracting Officer.

Contractor's Signature:
Typed Name:
Title:
Date:
This Plan is Accepted By:
Contracting Officer
Date:
NOTE: If this solicitation has options, the plan must contain separate goals for <u>each</u> option. EXAMPLE:
1. Option #
a. Total contract amount is \$
b. Total dollars planned to be subcontracted (to all types of businesses): \$

Type of Subcontractor	Amount Planned to be Subcontracted	Percentage of Subcontracted Dollars
Large Business		%
Small Businesses		%
- Small Disadvantaged*		%
- Small Women-Owned		%
- Small Service Disabled Veterans Owned		%
- Small Veteran Owned		%
HubZone Concern		%
Historical Black College and Minority Institution		%
Total		100%

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SECTION 00700 Contract Clauses

CLAUSES INCORPORATED BY REFERENCE:

	Definitions (Dec 2001) Alternate I	MAY 2001
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or	JAN 1997
52.203-10	Improper Activity Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	
52.204-4	Printed or Copied Double-Sided on Recycled Paper	AUG 2000
52.209-6	Protecting the Government's Interest When Subcontracting With	JUL 1995
32.20) 0	Contractors Debarred, Suspended, or Proposed for Debarment	0021//5
52.211-13	Time Extensions	SEP 2000
52.211-18	Variation in Estimated Quantity	APR 1984
52.215-2	Audit and RecordsNegotiation	JUN 1999
52.215-10	Price Reduction for Defective Cost or Pricing Data	OCT 1997
52.215-12	Subcontractor Cost or Pricing Data	OCT 1997
52.215-15	Pension Adjustments and Asset Reversions	DEC 1998
52.215-17	Waiver of Facilities Capital Cost of Money	OCT 1997
52.215-17	Reversion or Adjustment of Plans for Postretirement Benefits	OCT 1997
32.213-16	(PRB) Other than Pensions	001 1991
52.215-19	Notification of Ownership Changes	OCT 1997
52.216-7 Alt I	Allowable Cost and Payment (Apr 1998) - Alternate I	FEB 1997
52.219-8	Utilization of Small Business Concerns	OCT 2000
52.219-9	Small Business Subcontracting Plan	JAN 2002
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
52.219-23	Notice of Price Evaluation Adjustment for Small Disadvantaged	MAY 2001
	Business Concerns	
52.219-23 Alt I	Notice of Price Evaluation Adjustment for Small Disadvantaged	OCT 1998
	Business Concerns (May 2001) Alternate I	
52.219-23 Alt	Notice of Price Evaluation Adjustment for Small Disadvantaged	OCT 1998
II	Business Concerns (May 2001) Alternate II	0011)
52.222-3	Convict Labor	AUG 1996
52.222-4	Contract Work Hours and Safety Standards Act - Overtime	SEP 2000
	Compensation	2000
52.222-6	Davis Bacon Act	FEB 1995
52.222-7	Withholding of Funds	FEB 1988
52.222-8	Payrolls and Basic Records	FEB 1988
52.222-9	Apprentices and Trainees	FEB 1988
52.222-10	Compliance with Copeland Act Requirements	FEB 1988
52.222-11	Subcontracts (Labor Standards)	FEB 1988
52.222-12	Contract Termination-Debarment	FEB 1988
52.222-13	Compliance with Davis-Bacon and Related Act Regulations.	FEB 1988
52.222-13	Disputes Concerning Labor Standards	FEB 1988
52.222-15	Certification of Eligibility	FEB 1988
52.222-21	Prohibition Of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	FEB 1999
52.222-27	Affirmative Action Compliance Requirements for Construction	FEB 1999
52.222-35	Equal Opportunity For Disabled Veterans, Veterans of the Vietnam	
34.444-33	Equal Opportunity for Disabled veteralis, veteralis of the victibility	DLC 2001

	Era and Other Eligible Veterans	
52.222-36	Affirmative Action For Workers With Disabilities	JUN 1998
52.222-37	Employment Reports On Special Disabled Veterans, Veterans Of	DEC 2001
32.222-31	The Vietnam Era and Other Eligible Veterans	DEC 2001
52.223-6	Drug Free Workplace	MAY 2001
52.223-14	Toxic Chemical Release Reporting	OCT 2000
52.225-14	Restrictions on Certain Foreign Purchases	JUL 2000
52.226-1	Utilization Of Indian Organizations And Indian-Owned Economic	JUN 2000
32.220-1		JUN 2000
50 007 1	Enterprises Authorization and Consent	JUL 1995
52.227-1 52.227-2	Authorization and Consent	
32.221-2	Notice And Assistance Regarding Patent And Copyright	AUG 1996
52 227 4	Infringement Potent Indomnity Construction Contracts	A DD 1094
52.227-4	Patent Indemnity-Construction Contracts Bid Guarantee	APR 1984
52.228-1		SEP 1996
52.228-11	Pledges Of Assets	FEB 1992
52.228-14	Irrevocable Letter of Credit	DEC 1999
52.228-15	Performance and Payment BondsConstruction	JUL 2000
52.229-3	Federal, State And Local Taxes	JAN 1991
52.229-5	TaxesContracts Performed In U S Possessions Or Puerto Rico	APR 1984
52.232-5	Payments under Fixed-Price Construction Contracts	MAY 1997
52.232-5	Payments under Fixed-Price Construction Contracts	MAY 1997
52.232-10	Payments under Fixed-Price Architect-Engineer Contracts	AUG 1987
52.232-17	Interest	JUN 1996
	Assignment of Claims (Jan 1986) - Alternate I	APR 1984
52.232-25	Prompt Payment	MAY 2001
52.232-27	Prompt Payment for Construction Contracts	MAY 2001
52.232-33	Payment by Electronic Funds TransferCentral Contractor	MAY 1999
	Registration	
52.233-1	Disputes	DEC 1998
52.233-3	Protest After Award	AUG 1996
52.236-2	Differing Site Conditions	APR 1984
52.236-3	Site Investigation and Conditions Affecting the Work	APR 1984
52.236-5	Material and Workmanship	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-7	Permits and Responsibilities	NOV 1991
52.236-8	Other Contracts	APR 1984
52.236-9	Protection of Existing Vegetation, Structures, Equipment, Utilities,	APR 1984
	and Improvements	
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-12	Cleaning Up	APR 1984
52.236-13	Accident Prevention	NOV 1991
52.236-15	Schedules for Construction Contracts	APR 1984
52.236-17	Layout of Work	APR 1984
52.236-21	Specifications and Drawings for Construction	FEB 1997
52.236-21 Alt l	Specifications and Drawings for Construction (Feb 97) - Alternate	IAPR 1984
52.236-24	Work Oversight in Architect-Engineer Contracts	APR 1984
52.236-25	Requirements for Registration of Designers	APR 1984
52.236-26	Preconstruction Conference	FEB 1995
52.242-13	Bankruptcy	JUL 1995
52.242-14	Suspension of Work	APR 1984
	I ChangesFixed Price (Aug 1987) - Alternate III	APR 1984
52.243-4	Changes	AUG 1987
52.244-4	Subcontractors and Outside Associates and Consultants (Architect	
	Engineer Services)	
	,	

52.244-6	Subcontracts for Commercial Items	DEC 2001
52.246-12	Inspection of Construction	AUG 1996
52.247-34	F.O.B. Destination	NOV 1991
52.249-2 Alt I	Termination for Convenience of the Government (Fixed-Price) (Sep	SEP 1996
	1996) - Alternate I	
52.249-7	Termination (Fixed-Price Architect-Engineer)	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-	MAR 1999
	Contract-Related Felonies	
252.203-7002	Display Of DOD Hotline Poster	DEC 1991
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004	Required Central Contractor Registration	NOV 2001
252.205-7000	Provisions Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7000	Acquisition From Subcontractors Subject To On-Site Inspection	NOV 1995
	Under The Intermediate Range Nuclear Forces (INF) Treaty	
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The	MAR 1998
	Government of a Terrorist Country	
252.215-7000	Pricing Adjustments	DEC 1991
252.215-7002	Cost Estimating System Requirements	OCT 1998
252.219-7003	Small, Small Disadvantaged and Women-Owned Small Business	APR 1996
	Subcontracting Plan (DOD Contracts)	
252.225-7012	Preference For Certain Domestic Commodities	AUG 2000
252.225-7031	Secondary Arab Boycott Of Israel	JUN 1992
252.226-7001	Utilization of Indian Organizations and Indian-Owned Economic	SEP 2001
	Enterprises-DoD Contracts	
252.227-7015	Technical DataCommercial Items	NOV 1995
252.227-7022	Government Rights (Unlimited)	MAR 1979
252.227-7027	Deferred Ordering Of Technical Data Or Computer Software	APR 1988
252.227-7033	Rights in Shop Drawings	APR 1966
252.227-7037	Validation of Restrictive Markings on Technical Data	SEP 1999
252.231-7000	Supplemental Cost Principles	DEC 1991
252.236-7000	Modification Proposals-Price Breakdown	DEC 1991
252.242-7000	Postaward Conference	DEC 1991
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.244-7000	Subcontracts for Commercial Items and Commercial Components	MAR 2000
	(DoD Contracts)	
252.246-7000	Material Inspection And Receiving Report	DEC 1991
252.247-7023	Transportation of Supplies by Sea	MAR 2000
252.247-7024	Notification Of Transportation Of Supplies By Sea	MAR 2000
252.248-7000	Preparation Of Value Engineering Change Proposal	MAY 1994

CLAUSES INCORPORATED BY FULL TEXT

52.215-20 REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA (OCT 1997)—ALTERNATE IV (OCT 1997)

- (a) Submission of cost or pricing data is not required.
- (b) Provide information <u>described in section 00110 SUBMISSION REQUIREMENTS AND INSTRUCTIONS.</u>
- 52.215-21 REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST

OR PRICING DATA--MODIFICATIONS (OCT 1997)

- (a) Exceptions from cost or pricing data. (1) In lieu of submitting cost or pricing data for modifications under this contract, for price adjustments expected to exceed the threshold set forth at FAR 15.403-4 on the date of the agreement on price or the date of the award, whichever is later, the Contractor may submit a written request for exception by submitting the information described in the following subparagraphs. The Contracting Officer may require additional supporting information, but only to the extent necessary to determine whether an exception should be granted, and whether the price is fair and reasonable--
- (i) Identification of the law or regulation establishing the price offered. If the price is controlled under law by periodic rulings, reviews, or similar actions of a governmental body, attach a copy of the controlling document, unless it was previously submitted to the contracting office.
- (ii) Information on modifications of contracts or subcontracts for commercial items. (A) If-
- (1) The original contract or subcontract was granted an exception from cost or pricing data requirements because the price agreed upon was based on adequate price competition or prices set by law or regulation, or was a contract or subcontract for the acquisition of a commercial item; and
- (2) The modification (to the contract or subcontract) is not exempted based on one of these exceptions, then the Contractor may provide information to establish that the modification would not change the contract or subcontract from a contract or subcontract for the acquisition of a commercial item to a contract or subcontract for the acquisition of an item other than a commercial item.
- (B) For a commercial item exception, the Contractor shall provide, at a minimum, information on prices at which the same item or similar items have previously been sold that is adequate for evaluating the reasonableness of the price of the modification. Such information may include--
- (1) For catalog items, a copy of or identification of the catalog and its date, or the appropriate pages for the offered items, or a statement that the catalog is on file in the buying office to which the proposal is being submitted. Provide a copy or describe current discount policies and price lists (published or unpublished), e.g., wholesale, original equipment manufacturer, or reseller. Also explain the basis of each offered price and its relationship to the established catalog price, including how the proposed price relates to the price of recent sales in quantities similar to the proposed quantities.
- (2) For market-priced items, the source and date or period of the market quotation or other basis for market price, the base amount, and applicable discounts. In addition, describe the nature of the market.
- (3) For items included on an active Federal Supply Service Multiple Award Schedule contract, proof that an exception has been granted for the schedule item.
- (2) The Contractor grants the Contracting Officer or an authorized representative the right to examine, at any time before award, books, records, documents, or other directly pertinent records to verify any request for an exception under this clause, and the reasonableness of price. For items priced using catalog or market prices, or law or regulation, access does not extend to cost or profit information or other data relevant solely to the Contractor's determination of the prices to be offered in the catalog or marketplace.
- (b) Requirements for cost or pricing data. If the Contractor is not granted an exception from the requirement to submit cost or pricing data, the following applies:
- (1) The Contractor shall submit cost or pricing data and supporting attachments in accordance with Table 15-2 of FAR 15.408.

As soon as practicable after agreement on price, but before award (except for unpriced actions), the Contractor shall submit a Certificate of Current Cost or Pricing Data, as prescribed by FAR 15.406-2.

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

- (a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.
- (b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
6.5%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

- (c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.
- (d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --
- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer's identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;
- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.
- (e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Riley and Geary Counties, Kansas.

52.225-11 BUY AMERICAN ACT--BALANCE OF PAYMENTS PROGRAM--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (DEC 2001)

(a) Definitions. As used in this clause--

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

- (1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the end product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or
- (2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

Designated country means any of the following countries: Aruba, Austria, Bangladesh, Belgium, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Canada, Cape Verde, Central African Republic, Chad, Comoros, Denmark, Djibouti, Equatorial Guinea, Finland, France, Gambia, Germany, Greece, Guinea, Guinea-Bissau, Haiti, Hong Kong, Iceland, Ireland, Israel, Italy, Japan.

Kiribati, Korea, Republic of, Lesotho, Liechtenstein, Luxembourg, Malawi, Maldives, Mali, Mozambique, Nepal, Netherlands, Niger, Norway, Portugal, Rwanda.

Sao Tome and Principe, Sierra Leone, Singapore, Somalia, Spain, Sweden, Switzerland, Tanzania U.R., Togo, Tuvalu, Uganda, United Kingdom, Vanuatu, Western Samoa, Yemen.

Designated country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a designated country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

Domestic construction material means--

- (1) An unmanufactured construction material mined or produced in the United States; or
- (2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

Foreign construction material means a construction material other than a domestic construction material.

North American Free Trade Agreement country means Canada or Mexico.

North American Free Trade Agreement country construction material means a construction material that-

- (1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

- (b) Construction materials. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) and the Balance of Payments Program by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and the North American Free Trade Agreement (NAFTA) apply to this acquisition. Therefore, the Buy American Act and Balance of Payments Program restrictions are waived for designated country and NAFTA country construction materials.
- (2) The Contractor shall use only domestic, designated country, or NAFTA country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.
- (3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows:

 NONE --
- (4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--
- (i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;
- (ii) The application of the restriction of the Buy American Act or Balance of Payments Program to a particular construction material would be impracticable or inconsistent with the public interest; or
- (iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.
- (c) Request for determination of inapplicability of the Buy American Act or Balance of Payments Program. (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--
- (A) A description of the foreign and domestic construction materials;
- (B) Unit of measure;
- (C) Quantity;
- (D) Price;
- (E) Time of delivery or availability;
- (F) Location of the construction project;
- (G) Name and address of the proposed supplier; and

- (H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.
- (ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.
- (iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).
- (iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.
- (2) If the Government determines after contract award that an exception to the Buy American Act or Balance of Payments Program applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.
- (3) Unless the Government determines that an exception to the Buy American Act or Balance of Payments Program applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.
- (d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description Unit of measure Quantity Price (dollars) \1\

Item 1:

Foreign construction material...

Domestic construction material...

Item 2:

Foreign construction material...

Domestic construction material...

Domestic construction material...

\1\ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).

List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.

Include other applicable supporting information.

(End of clause)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least TWENTY PERCENT (20%) of the total amount of construction work to be performed under the contract (design work by the A-E of record is not covered by this clause). This percentage may be reduced by a supplemental agreement to this

contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

- (a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.
- (b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if--
- (1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include
- (i) acts of God or of the public enemy,
- (ii) acts of the Government in either its sovereign or contractual capacity,
- (iii) acts of another Contractor in the performance of a contract with the Government,
- (iv) fires,
- (v) floods,
- (vi) epidemics,
- (vii) quarantine restrictions,
- (viii) strikes,
- (ix) freight embargoes,
- (x) unusually severe weather, or delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and
- (2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.
- (c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided

by law or under this contract.

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far/

http://web2.deskbook.osd.mil/default.asp

http://web2.deskbook.osd.mil/default.asp

http://acqnet.saalt.army.mil/library/AFAR/AFARS OCTOBER 2001.pdf

http://www.hq.usace.army.mil/cepr/asp/library/efar.asp?strCat=7&strSubCat=7

SECTION 00800 Special Contract Requirements

CLAUSES INCORPORATED BY REFERENCE:

EM 385-1-1 USACE Safety and Health Requirements Manual, EM 385-1-1 FEB 2001 Note

CLAUSES INCORPORATED BY FULL TEXT

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

- (a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$755.00 for each calendar day of delay until the work is completed or accepted.
- (b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

SCR-DB-001 DESIGN-BUILD CONTRACT - ORDER OF PRECEDENCE - AUG 1997

- (a) The contract includes the standard contract clauses and schedules current at the time of contract award. It entails (1) the solicitation in its entirety, including all drawings, cuts, and illustrations, and any amendments, and (2) the successful offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any way bears upon the terms of that agreement.
- (b) In the event of conflict or inconsistency between any of the provisions of this contract, precedence shall be given in the following order:
- (1) Betterments: Any portions of the accepted proposal which both conform to and exceed the provisions of the solicitation.
- (2) The provisions of the solicitation. (See also Contract Clause: SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION.)
- (3) All other provisions of the accepted proposal.
- (4) Any design products including, but not limited to, plans, specifications, engineering studies and analyses, shop drawings, equipment installation drawings, etc. These are "deliverables" under the contract and are not part of the contract itself. Design products must conform with all provisions of the contract, in the order of precedence herein.

(End of Clause)

PROPOSED BETTERMENTS - AUG 1997

- (a) The minimum requirements of the contract are identified in the Request for Proposal. All betterments offered in the proposal become a requirement of the awarded contract.
- (b) A "Betterment' is defined as any component or system, which exceeds the minimum requirements stated in the Request for Proposal. This includes all proposed betterments listed in accordance with the "Proposal Submission Requirements" of the Solicitation, and all Government identified betterments.
- (c) "Government identified betterments" include the betterments identified on the "List of Accepted Project Betterments" prepared by the Proposal Evaluation Board and made part of the contract by alteration, and all other betterments identified in the accepted Proposal after award.

(End of Clause)

SCR-DB-003 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (FAR 42.21 1 -1 0) (APR 1984)

(a) The Contractor shall be required to (a) commence work under this contract within ten (10) calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than the dates or number of calendar days after the date of receipt by him of notice to proceed set forth in the schedule below except as specified in the various landscaping sections. The time stated for completion shall include final cleanup of the premises.

SCHEDULE

Item of Work	Commencement Time	Completion Time In Calendar Days After Receipt of Notice to Proceed	Liquidated Damages Per Calendar Day
1.1 Design and	TEN (10) CALENDER	SIX HUNDRED	See clause 52.211-12
Construction of Child	DAYS AFTER	THIRTY (630)	
Development Center,	RECEIPT OF NOTICE	CALENDAR DAYS	
Complete	TO PROCEED	(See Note 1)	

NOTES:

- 1. The completion time includes an allowance for Government review of scheduled design submittals as described in Section 01331 for submittal procedures for design after award. The ACO or COR will notify the contractor in writing when the design is cleared for construction.
- 2. Landscaping and Establishment of Turf. The playground turf (inside fenced areas) shall be established in accordance wiithh the requirements of Section 01012, paragraph 1.6.12: Turf. Landscaping and Turf work outside the fenced areashall be accomplished during the planting season, or portion thereof (but not less than 15 days), concurrent with or immediately following substantial completion of building construction, Maintenance, watering, fertilization, and replacement of dead vegetation shall commence immediately after each plant is planted, mulched, and staked and shall continue for the period stated in the technical requirements. No payment will be made for

Landscaping or Establishment of Turf until all technical requirements of have been adequately performed and accepted, as determined by the Contracting Officer.

3. As-Built Drawings, O&M Manuals, and User Training. The value of these services are pre-set by the Government at \$30,000.00. Upon satisfactory completion of this work the Contractor shall have earned the amount indicated.

(End of Clause)

KEY PERSONNEL. SUBCONTRACTORS AND OUTSIDE ASSOCIATES OR CONSULTANTS – AUG 1997

In connection with the services covered by this contract, any in-house personnel, subcontractors, and outside associates or consultants will be limited to individuals or firms that were specifically identified and agreed to during negotiations. The contractor shall obtain the Contracting Officer's written consent before making any substitution for these designated in-house personnel, subcontractors, associates, or consultants.

(End of Clause)

RESPONSIBILITY OF THE CONTRACTOR FOR DESIGN – FEB 2000

- (a) The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications, and any other non-construction services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiency in its designs, drawings, specifications, and other non-construction services and perform any necessary rework or modifications, including any damage to real or personal property, resulting from the design error or omission.
- (b) Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract. The Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of the services described in paragraph (a) furnished under this contract.
- (c) The rights and remedies of the Government provided for under this contract are in addition to any other rights and remedies provided by law.
- (d) if the Contractor is comprised of more than on legal entity, each entity shall be jointly and severally liable thereunder.

(End of Clause)

WARRANTY OF CONSTRUCTION WORK - AUG 1997

- (a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (1) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.
- (b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.
- (c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of:

- (1) The Contractor's failure to conform to contract requirements; or
- (2) Any defect of equipment, material, or workmanship.
- (d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.
- (e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

Obtain all warranties that would be given in normal commercial practice;

Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

- (h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.
- (i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.
- (j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of Clause) SEQUENCE OF DESIGN -CONSTRUCTION (FAST TRACK) – AUG 1997

- (a) After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements as covered under Division 01 General Requirements, and obtain Government review of each submission. The Contractor may begin construction on portions of the work for which the Government has reviewed the final design submission and has determined satisfactory for purposes of beginning construction. The ACO or COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.
- (b) If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.
- (c) No payment will be made for any in-place construction until all required Submittals have been made, reviewed and are satisfactory to the Government.

(End of Clause)

CONSTRUCTOR'S ROLE DURING DESIGN PROCESS – JUN 1998

The Contractor's construction management key personnel shall be actively involved during the design process to effectively integrate the design and construction requirements of this contract. In addition to the typical required construction activities, the Contractor's involvement includes, but is not limited to, actions such as: integrating the design schedule into the Master Schedule to maximize the effectiveness of fasttracking design and construction (within the limits allowed in the contract), ensuring constructibility and economy of the design, integrating the shop drawing and installation drawing process into the design, executing the material and equipment acquisition programs to meet critical schedules, effectively interfacing the construction QC program with the design QC program, and maintaining and providing the design team with accurate, up-to-date redline and as-built documentation. The Contractor shall require and manage the active involvement of key trade subcontractors in the above activities.

(End of Clause)

SCR-DB-010 VALUE ENGINEERING AFTER AWARD – JUNE 1999

- (a) In reference to Contract Clause 52.248-3, "Value Engineering Construction," the Government may refuse to entertain a "Value Engineering Change Proposal" (VECP) for those "performance oriented" aspects of the Solicitation documents which were addressed in the Contractor's accepted contract proposal and which were evaluated in competition with other offerors for award of this contract.
- (b) The Government may consider a VECP for those "prescriptive" aspects of the Solicitation documents, not addressed in the Contractor's accepted contract proposal or addressed but evaluated only for minimum conformance with the Solicitation requirements.
- (c) For purposes of this clause, the term "performance oriented" refers to those aspects of the design criteria or other contract requirements which allow the Offeror or Contractor certain latitude, choice of and flexibility to propose in its accepted contract offer a choice of design, technical approach, design solution, construction approach or other approach to fulfill the contract requirements. Such requirements generally tend to be expressed in terms of functions to be performed, performance required or essential physical characteristics, without dictating a specific process or specific design solution for achieving the desired result.
- (d) In contrast, for purposes of this clause, the term "prescriptive" refers to those aspects of the design criteria or other Solicitation requirements wherein the Government expressed the design solution or other requirements in terms of specific material, approaches, systems, and/or processes to be used. Prescriptive aspects typically allow the Offerors little or no freedom in the choice of design approach, materials, fabrication techniques, methods of installation, or any other approach to fulfill the contract requirements.

(End of Clause)

SCR-DB-011 PARTNERING – FEB 2000

In order to most effectively accomplish this contract, the Government proposes to form a partnership with the Contractor to develop a cohesive building team. It is anticipated that this partnership would involve the Corps of Engineers, Fort Riley Public Works Partnering Directorate Community Activities, the Contractor, primary subcontractors and the designers. This partnership would strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership would be bilateral in membership and participation will be totally voluntary. Any cost associated with effectuating this partnership, excluding travel and lodging cost of Government personnel, will be borne by the Contractor/each part/the Government. The partnering meetings shall be held at a mutually agreed upon time and date, soon after contract award.

(End of Clause)

SCR-DB-012 DESIGN CONFERENCES – AUG 1997

- (a) Pre-Work: As part of the Pre-work Conference conducted after contract award, key representatives of the Government and the Contractor will review the design submission and review procedures specified herein, discuss the preliminary design schedule and provisions for phase completion of the D/B documents with construction activities (fast tracking), as appropriate, meet with Corps of Engineers Design Review personnel and key Using Agency points of contact and any other appropriate pre-design discussion items.
- (b) Design Review Conferences: Review conferences will be held on base for each design for each submittal. The Contractor will bring the personnel that developed the design submittal to the review conference. The conferences will take place the week after the review is complete.

(End of Clause)

SCR-DB-013 TRAINING – FEB 2000

The Contractor shall provide operational and maintenance training for all systems furnished under this contract for the operating and maintenance personnel. The system manufacturer shall put on the training, where feasible. All operation and maintenance manuals shall be submitted and approved prior to conducting the training and shall be used during training. The Contractor shall video tape the training session on VHS tapes and provide the tapes to the Government.

(End of Clause)

RECOMMENDED INSURANCE COVERAGE (FEB 2000)

The Design-Build Contractor's attention is invited to the contract requirements concerning "RESPONSIBILITY OF THE CONTRACTOR FOR DESIGN" and "WARRANTY OF CONSTRUCTION WORK." These requirements vest in the Contractor complete responsibility for the professional quality, technical accuracy, and coordination of all design, drawings, specifications and other work or materials furnished by his in-house or consultant forces. The Design-Build Contractor must correct and revise any errors or deficiencies in his work, notwithstanding any review, approval, acceptance or payment by the Government. The Contractor must correct and change any work resulting from his defective design at no additional cost to the Government. The requirements further stipulate that the Design-Build Contractor shall be liable to the Government caused by negligent performance. Though not a mandatory requirement, this is to recommend that the Design-Build Contractor investigate and obtain appropriate insurance coverage for such liability protection.

SCR__ SUBMITTAL OF WORK TO BE PERFORMED BY THE CONTRACTOR (FEB 2000)

The Contractor shall furnish the Contracting Officer within 10 days after the award the items of work he will performed with his own forces and the estimated cost of those items. The percentage of work that must be performed by the Contractor is stated in Contract Clause 52.236-1, "Performance of Work by the Contractor."

(End of Clause)

SECTION 00810

WAGE RATES

- 1. KS020010, dated 04/05/02, 1 mod.
- 2. KS020011, dated 04/05/02, 1 mod.
- 3. KS020027, date 03/01/02, no mods.

GENERAL DECISION KS020010 04/05/02 KS10 General Decision Number KS020010

Superseded General Decision No. KS010010

State: Kansas

Construction Type:

BUILDING

County(ies):

GEARY

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

 $\begin{array}{ccc} \text{Modification Number} & \text{Publication Date} \\ & 0 & 03/01/2002 \end{array}$

1 04/05/2002

COUNTY(ies):

GEARY

PLUM0165E 06/01/2001

PLUMBERS Rates Fringes
24.24 7.35

ROOF0020P 06/01/2001

Rates Fringes
ROOFERS 21.01 6.44

* SFKS0669B 04/01/2002

Rates Fringes
SPRINKLERFITTERS 27.01 7.05

SHEE0077C 06/01/2001

SHEETMETAL WORKERS (Including
HVAC Duct Work) 23.58 7.34

Rates Fringes

SUKS1024A 03/01/2000

Rates Fringes BRICKLAYERS 18.00

CARPENTER (Including Drywall Hanging

and Excluding Installation, Batt) 12.93 3.01

CEMENT MASON 11.00 0.44

LABORERS:

Unskilled (Excluding Blown

Insulation) 8.42

PAINTER, BRUSH/ROLLER

(Including Drywall Finishing) 11.39

POWER EQUIPMENT OPERATOR:

Backhoe 13.19 2.68

Rollers (All Types) 10.53

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after

award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

- 1.) Has there been an initial decision in the matter? This can be:
- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an

KS020010 2 04/05/02

interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

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requestor considers relevant to the issue.

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4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

KS020010 3 04/05/02

GENERAL DECISION KS020011 04/05/02 KS11 General Decision Number KS020011

Superseded General Decision No. KS010011

State: Kansas

Construction Type:

BUILDING

County(ies):

RILEY

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

Modification Number Publication Date
0 03/01/2002
1 04/05/2002

COUNTY(ies):

RILEY

PLUM0165A 06/01/2001

Rates Fringes
PLUMBERS 24.24 7.35

ROOF0020P 06/01/2001

Rates Fringes
ROOFERS 21.01 6.44

* SFKS0669B 04/01/2002

Rates Fringes
SPRINKLERFITTERS 27.01 7.05

SHEE0077C 06/01/2001

Rates Fringes
SHEETMETAL WORKERS (Including
HVAC Duct Work) 23.58 7.34

SUKS1029A 03/01/2000

Rates Fringes BRICKLAYERS 18.00

CARPENTERS (Including Drywall Hanging

and Excluding Insulation, Batt) 12.93 3.01

CEMENT MASONS 11.00 0.44

LABORERS:

Unskilled (Excluding Blown

Installation) 8.42

PAINTER:

Brush/Roller (Including Drywall

Finishing) 11.39

POWER EQUIPMENT OPERATORS:

Backhoe 13.19 2.68

Rollers (All Types) 10.53

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within

the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

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KS020011 2 04/05/02

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KS020011 3 04/05/02

GENERAL DECISION KS020027 03/01/02 KS27 General Decision Number KS020027

Superseded General Decision No. KS010027

State: Kansas

Construction Type:

HEAVY

SEWER AND WATER LINE

County(ies):

GEARY RILEY

HEAVY, SEWER AND WATER LINE CONSTRUCTION PROJECTS

COUNTY(ies):

GEARY RILEY

SUKS2002A 01/22/1988

BRICKLAYERS	Rates 15.89	Fringes
CARPENTERS CEMENT MASONS	10.06 8.93	1.80
ELECTRICIANS	14.24	1.25
FORM SETTERS	7.10	
LABORERS: Laborers Pipelayers Rebar workers PIPEFITTERS	6.23 5.83 11.18 16.74	1.52
PLUMBERS	17.65	1.98
POWER EQUIPMENT OPERATORS: Backhoe Bulldozer Crane Grader Loader	7.59 6.50 8.55 7.47 7.70	
TRUCK DRIVERS	5.94	

WELDERS: Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after

KS020027 1 03/01/02

award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

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KS020027 2 03/01/02

Administrative Review Board U. S. Department of Labor 200 Constitution Avenue, N. W. Washington, D. C. 20210

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DIVISION 1 – GENERAL REQUIREMENTS

01010	Statement of Work
01011	Geotechnical
01012	Site Work/Civil/Utilities
01013	Architectural Building Requirements
01014	Interior Design
01015	Structural Requirements
01016	Mechanical Requirements
01017	Electrical Requirements
01018	Fire Protection Requirements
01019	35 Percent Design
01020	60 Percent Design
01021	100 Percent Design
01100	General
01290	KCD Structural Design Guidance Controlling Criteria
01312	Quality Control System
01320	Project Schedule
01331	•
01332	Submittal Procedures for Construction (Design-Build)
01355	Environmental Protection
01356	Storm Water Pollution Prevention Measures
01415	Metric Measurement
01451	Contractor Quality Control (Design-Build)
01500	Temporary Construction Facilities
01670	Recycled/Recovered Materials
01780	Closeout Submittals

SECTION 01010

STATEMENT OF WORK

PART 1 PROJECT SCOPE OF WORK

1.1 GENERAL

This contract includes all design and construction necessary to provide a complete and usable Child Development Center (CDC) for School Age Children, ages 6 to 10. The gross area of the facility is approximately 2176 square meters (23,420 square feet). The CDC will be a single story structure, located immediate adjacent to a Youth Activity Center (YAC), constructed in about 1984. The CDC exterior shall coordinate with and be compatible with the YAC architectural theme.

Site development includes all supporting utility services, paved access roads, sidewalks, curb and gutter, and parking areas for both Privately Owned Vehicles and Government Owned Vehicles, a sports field, playground constructed on a composite base, and other site improvements described in this Request for Proposal and shown on the enclosed conceptual drawings. The building includes a multi-purpose room; open atrium areas; administrative offices and a staff training room; a commercial kitchen; separate adult and children's restrooms; a computer lab; activity rooms; laundry, communications, electrical and mechanical rooms; a dry food storage room; a walk-in refrigerator and a walk-in freezer.

Project requirements include a standing seam metal roof, handicap access, exterior lighting, security fencing, energy monitoring and controls, fire protection and alarm systems, HVAC systems, and electrical service. Structural considerations include seismic design and severe storm (tornado) shelter for building occupants. AT/FP measurements include laminated glass, traffic control barriers, barrier landscaping and 25 meter (82-foot) stand-off distances between the structure and roads and parking areas.

Verification of existing site conditions, site surveys, geotechnical investigations, and all other information prerequisite for design and construction of a complete and usable facility and not contained in this Request for Proposal (RFP) are the express responsibility of the Contractor.

NOTE: The term "Proposer" shall be read as "Contractor" following contract award.

1.2 PROJECT LOCATION AND PROPOSED SITE PLANS

Fort Riley, Kansas is located 160 kilometers (100 miles) west of Kansas City, Missouri. The construction is located on the Custer Hill portion of Fort Riley at the intersection of Long Street and Thomas Avenue. A location map depicting the various facilities to be constructed is included in this RFP.

1.3 GOALS AND OBJECTIVES

Fort Riley Child and Youth Services intends to operate the CDC as a certified school age program, certified by the National School Age Care

Alliance (NSACA), which is the national accreditation body recognized by the U.S. Army. The facility will be used for after school and summer programs. Based on NSACA standards, the CDC will accommodate 225 children, calculated using a variety of occupant load factors that require from 3.25 square meters (35 ft2) per child for quiet activities, to 7 square meters (75 ft2) per child for high activity space. Administrative space and offices for caregivers and other staff members is included in the design.

PART 2 CODES AND STANDARDS

The CDC shall be designed and constructed in accordance with the applicable codes, standards, design parameters (Ft. Riley Installation Design Guide), regulations and other criteria provided in the following sections of this RFP. In case of conflict between these requirements, the most stringent shall apply, unless otherwise directed by the Contracting Officer. Reference to standard specifications of any technical society, organization or association, or to codes, manuals, regulations, specification, or tentative specification adopted and published at least 90 days prior to submittal of proposal, unless specifically stated otherwise. When any code or standard references the "governmental authority" or the authority having "jurisdiction", this reference shall be interpreted as referring to the Contracting Officer.

Military criteria and guide specifications are available on the following internet sites:

www.usace.army.mil/inet/usace.docs
www.hnd.usace.army.mil/techinfo/instruct.htm

Additional information is available in the Ft. Riley Installation Design Guide, included with RFP on compact Disk.

2.1 SUSTAINABLE DESIGN REQUIREMENTS

The design of this project shall produce an environmentally sustainable facility in accordance with the Army's Engineering Technical Letter (ETL) No. 1110-3-491 (1 May 2001) available at website: http://www.hnd.usace.army.mil/techinfo/engpubs.htm/. The facility, as a minimum, shall achieve a Bronze level rating in accordance with the Army's "SpiRiT" rating system as described and detailed in Appendix C of the ETL 1110-3-491. The Contractor shall use methods and materials in the facility design to include site, building construction, and mechanical and electrical systems that promote and utilize sustainable design principles. Facility design sustainable features and the corresponding SPiRiT rating shall be clearly defined and detailed in the design analysis.

-- End of Section --

SECTION 01011

GEOTECHNICAL

PART 1 GENERAL

1.1 Geotechnical Design Parameters

The Contractor shall adhere to all requirements presented in the "Child Development Center, Subsurface Investigation Report" dated October 2001 (revised February 2002). This report is Appendix A of this RFP document.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01012

SITE WORK/CIVIL/UTILITIES

PART 1 GENERAL

DEPARTMENT OF THE ARMY

TM 5-822-5	(June 92) Pavement Design for Roads, Streets Walks, and Open Storage Areas [Ref: AFM 88-7, Chap. 1]
TM 5-813-5	(3 Nov 86) Water Supply, Water Distribution [Ref: AFM 88-10, Vol 5]
TM 5-813-7	(2 Sep 86) Water Supply for Special Project [Ref: AFM 88-10, Vol 7]
TM 5-814-1	(4 Mar 85) Sanitary and Industrial Wastewater Collection - Gravity Sewers and Appurtenances [Ref: AFM 88-11, Vol 1]
TM 5-814-2	(15 Mar 85) Sanitary and Industrial Wastewater Collection Pumping Stations and Force Mains [Ref: AFM 88-11, Vol 2]
	(15 Mar 85) Sanitary and Industrial Wastewater Collection Pumping Stations and Force Mains [Ref: AFM 88-11, Vol 2]

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C651 (1992)Disinfecting Water Mains

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA ATLAS 2 (1973) Precipitation-Frequency Atlas of the Western United States

National Institute of Standards and Technology (NIST)

NIST 44 (Current Edition) Weights and Measures Handbook 44

- 1.1 NOT USED
- 1.2 SURVEY
- 1.2.1 Field Survey.

The engineering survey to be used in the development of the design submittal is available to the Contractor on CD-ROM furnished with this solicitation. The information is in a 3-d Bentley Microstation metric drawing file. The survey data information was gathered by a topographical survey performed in October of 2001. Contours were gathered at .20 m intervals. The survey drawings shall be used by the Contractor to prepare for development of design drawings. Any additional survey information required by the Contractor for preparation of his proposal or for development of design drawings shall be obtained by the Contractor at his own expense.

1.2.2 Setting of Surveying Monuments

The Contractor shall set two permanent surveying monuments on the Child Development Center Site, in accordance with this paragraph. The monuments will be established to second order horizontal and vertical control. The actual monument locations shall be intervisible, and shall be approved by the Contracting Officer's Representative (COR) prior to establishment. The monuments will be constructed as a Type G monument. Field notes, as well as final monument horizontal and vertical coordinates shall be provided to the COR.

1.3 STAGING AND CONTRACTORS ACCESS

1.3.1 Staging Area

The location of the Contractor staging area shall be as shown on the drawings of the RFP solicitation package. Staging area shall be returned to its original condition upon completion of construction.

1.3.2 Contractors Access Route

The Contractor's Access Route will be as shown on the drawings of the RFP solicitation package.

1.4 DEMOLITION

The Contractor shall remove all pavements, utilities and other appurtenances necessary to construct the new facility. The Fort Riley construction debris landfill is located on Campbell Hill Road approximately one mile north of Camp Funston. There is no charge for using the landfill. The CD landfill will have an attendant on duty and be open for normal operations(excluding federal holidays) Monday-Friday, 0730-1600. Only construction demolition debris materials will be accepted. Acceptable materials are posted on the board at the entrance. All transformers and light ballasts shall be turned in to Building 339 within the PW maintenance yard on Main Post. Light ballasts shall have all wires cut off. POC is Don Wainwright, telephone (785) 239-3832. The Contractor shall notify the Contracting Officer if any material to be disposed of is found to contain hazardous, toxic, biological or radiological substances. Rubbish and debris shall be removed from the site on a daily basis to avoid accumulation at the project site. Any salvageable items shall be turned into the Directorate of Environment and Safety (DES) Recycle Center, Building 1980, in Camp Funston. POC is the Solid Waste Program Manager, DES, telephone (785) 239-2860. Demolition shall conform to Unified Facilities Guide Specification (UFGS) Section 02220 DEMOLITION.

1.5 NEW CONSTRUCTION

The location and construction of the Child Development Center, access drive, parking, utilities and landscaping shall be as indicated on the attached drawings and in the specifications.

New utility service lines shall consist of sanitary sewers, waterlines, gas lines, electrical power and communications lines.

1.5.1 Building

Location and construction of the Child Development Center, including associated structures, roads, parking, utilities and landscaping shall be as indicated on the attached drawings and as specified herein. The new building shall be fully handicap accessible. Minor changes to the overall layout may be accepted by the Government if it is beneficial to the overall design of the project.

1.5.2 Building Signs

The existing Horse Jump sign for the Youth Activities Center (YAC) shall be relocated as shown on the drawings. A new Horse Jump sign to match the existing sign shall be constructed and located as shown on the drawings. The new sign shall say: School Age Center.

1.5.3 Main Entrance/Courtyard.

The entrance walk and parking lot layout shall be as shown on the drawings, though minor alterations may be made as the site design is further developed. The walk shall be 150 mm thick concrete with approximately 1.2 m square joint patterns formed by contraction and/or expansion joints. Concrete surfacing shall have a medium-broom finish with smooth troweled joints approximately 85mm in width.

The Contractor shall develop an alternative (price options) for architectural paving of the area between the New Child Development Center and the Existing Youth Activities Center. The Architectural paving option shall consist of stamped integral colored concrete. The color shall be brick red. This alternative shall be in addition to the basic concrete sidewalk. Plans and Details of the alternative shall be provided.

1.5.4 Walks

Exterior concrete walks (150mm thick) shall be placed at the locations indicated on the Site Plan. Walks shall have a medium broom finish. Adjustments to the walk layout may be made to facilitate the final Site Plan. Walks along the parking lots shall be a minimum of 2.4 m wide. Walks leading to the main entrance shall be a minimum of 3.0 m wide and match the width of the front facade of the building. Walks leading to all other entrances shall be a minimum of 1.8 m wide. Walks 2.4 m wide shall have a 1.2 m square joint pattern, and walks 3.0 m wide shall have a 1.5 m square joint pattern.

1.5.5 Parking Areas

Parking areas are indicated on the Site Plan and shall be located a minimum of 25 meters (82 feet) from the building main entrance. Provide, as a minimum, the number of parking spaces as indicated on the Site Plan. Four handicap van-accessible universal stalls in accordance with January 1998 Accessibility Guidelines for Buildings and Facilities, Appendix (with

striping, signage, and ramps) shall be provided for the customer parking lot. Two handicap accessible parking stalls shall be provided at the staff parking lot. Adjustments to the parking lots as shown may be made but must be approved by the Government. The number of parking stalls shall be as shown on the drawings. Regular parking stalls shall be a minimum of 3.05 m wide and 6.10 m long. Driving lanes shall be a minimum of 7.32 m wide. Parking stalls shall be delineated with 100 mm white stripes. Customer parking lot shall accomodate the movement of large school buses. School buses will maneuver through the parking lot and park at the locations shown on the drawings. Two large and two small school buses will park in the customer lot as shown on the site plan. Provide integral curb, double purpose walk, or concrete curb and gutter as shown on the Site Plan. Pavement edges not receiving integral curb, double purpose walk, or concrete curb and gutter shall have a 1.2 m graded shoulder.

See Section 01700: ELECTRICAL for exterior lighting requirements.

1.5.6 Access Drive

A 7.32~m wide school bus access and parking lot access drive will tie into Thomas avenue as shown on the drawings. All roads and drives shall be a minimum of 25~m from the building.

The Contractor shall phase construction of the access drive and parking lots so as to allow access and parking for the existing Youth Activity Center(YAC). This is a requirement for the duration of the contract.

1.5.7 Service Drive.

A Service Drive shall be provided as shown on the sheet C3.1. The Service Drive shall be asphalt and concrete pavement where indicated. A security gate (see paragraph 1.6.12d) shall be located as shown. In addition a concrete barrier curb shall be constructed across the service drive at the location shown on the drawings. The location of the curb may be adjusted but will be placed a minimum of 25 m from the buildings. Approval of the location of the curb will be by the government.

1.5.8 Fire Access Path

An unimproved grass Fire Access Path shall be constructed around the building and playgrounds to provide access for fire and emergency vehicles. Path shall be seeded with low growing field grass with a minimum width of $6.1\ m.$

1.5.9 Outdoor Activity Space

1.6.9.1 The Outdoor Activity Space shall consist of the following:

- a. A multi purpose area with movable scaled tables covered by a 7m by 7m shade structure. The shade structure shall be a SunPorts International Inc.(www.sunports.com) or approved equal. Structure shall consist of metal poles with a canvass roof.
- b. A swing area located near an edge to reduce cross traffic and potential conflicts with other play areas. An appropriately sized and surfaced fall zone shall surround the swings.
- c. A quiet area, which contains trees and/or shrub plantings. Boulders or other natural elements shall be informally located in this area for

children to sit.

- d. An imagination area with turf surface.
- e. A hard surface pathway to provide an accessible path of travel for pedestrians, people in wheelchairs and wheeled toys.

${\tt f.}$ A composite play structure shall be provided on a handicapped accessible synthetic safety surface.

- g. A fenced open turf area large enough to accommodate a US Youth soccer field (64 m long by 46 m wide = 70yds by 50yds). Striping of the field is not required. Contractor shall install the fence a minimum of 3 meters from the outside of the field. The soccer field shall be graded to minimize the amount of borrow material needed. Soccer field shall be sloped to drain across the fence line to exterior ditches. Maximum slope on soccer field shall be 2%.
- h. A 14m by 18m (46'by 59') asphalt play surface shall be located at the rear of the building adjacent to the Multi-Purpose room.

1.6.9.2 Playground Equipment

All playground equipment shall meet all U.S. Consumer Product Safety Commission (CPSC) standards. Equipment shall also meet requirements of the "American with Disabilities Act (ADA) Accessibility Guidelines for buildings and facilities; Play Areas". Equipment provided shall be age appropriate (6-10 years of age).

A composite play structure shall be shall be Landscape Structures Inc. Play Booster #2203 (www.playlsi.com) or approved equal. The minimum size area required for this structure is 24 by 20 Meters. From play booster #2203 the contractor shall eliminate the spring across and the log roll. Colors shall be coordinated with the shade stucture to be used for the multi purpose area. Equipment shall meet all fall height and fall zone criteria as determined by the equipment manufacturer. Safety surface shall be as descibed below.

A set of 6 single-axis (to-fro) swings shall be provided.

In addition the composite structure and all other playground equipment shall be constructed in accordance with the requirements of specification Section 02882 PLAYGROUND EQUIPMENT.

1.6.9.3 Playground Safety Surface

A synthetic safety surface shall be provided at the location shown on the drawings. The playground surfacing shall be a poured in place system consisting of an impact attenuating substrate and a wear course bonded together. The wear course shall consist of EPDM (Ethylene Propylene diene monomer) particles adhered with a polyurethane binder. The color shall be as determined by the user. Playground surfacing shall be constructed in accordance with the details provided and specification Section 02791 PLAYGROUND PROTECTIVE SURFACING.

The swing area shall be designed with a loose fill surfacing as specified in Section 02791 PLAYGROUND PROTECTIVE SURFACING.

Subsurface drainage shall be provided for areas surfaced with a synthetic safety surface and constructed in accordance with specification Section 02620A SUBDRAINAGE SYSTEM. See Subsurface Investigation Report (appendix A) for subdrainage requirements.

1.5.10 Screen Walls/Dumpster Enclosure

Construct screen walls to block the view of exterior mechanical equipment from vehicular and pedestrian traffic. Top of screen wall shall be no less than the top of any portion of the mechanical equipment. Also, construct a concrete dumpster pad with a three-sided screen wall enclosure. Screen walls shall be constructed of wood slats with brick columns on 10 foot centers. Column materials shall match the building exterior. The dumpster enclosure shall be a minimum of 10 m wide by 3.6 m deep by 2.44 m high. Dumpster enclosure shall be designed to enclose two dumpsters, one for the existing facility and one for the new facility. Location of the enclosure shall be as shown on the attached drawing. Exterior electrical transformers and switch pads shall be screened by landscape plantings and berming.

1.5.11 Landscaping

Landscaping developed for the play area (to include inside all fenced areas) will be part of the basic contract, while landscaping developed for the front of the building, parking lots, etc., will be a price option.

Landscape plan shall be designed to visually-enhance the new facility with color, form and screening. Trees and shrubs closer than 9 m to the building shall be chosen and arranged to minimize potential hiding places for terrorists; i.e., very low-growing evergreen shrubs with ornamental trees and small, open shrubs. Larger and denser trees and shrubs shall be planted at least 9 m from the building. Landscaping shall consist of low maintenance balled and burlapped trees and container-grown shrubs. Plant materials shall be climatized to the local area for a period of one growing season prior to planting and consist of the following. Plantings shall be chosen from the Installation Design Guide. Mulch trees to a minimum diameter of 1500 mm or 600 mm beyond the tips of tree branches and shrub planting beds with a 75 mm thick surface of shredded cedar mulch. Mulching for individually planted trees in lawn areas shall use shredded wood chips 125 mm thick. Plant beds not bordered by pavement shall be edged with commercial-quality black metal edging. Landscape plantings shall be specified in UFGS Sections 02930 EXTERIOR PLANTING and 02935 EXTERIOR PLANTING MAINTENANCE.

See drawing C8.1 for additional design guidance in regards to plantings. A list of toxic plants, not to be used for the CDC, is provided on drawing C8.2.

Berms on the south side of the parking shall be designed and built to provide a visual screen of the parked vehicles from traffic on Thomas Ave. and still allow a view of the New Child Development Center. The berms shall be approximately 1.5 m to 2 m high and have trees and shrub plant beds incorporated into their design. Maximum grade slope for berms shall be 3H:1V.

1.5.12 Turf

1.6.12.1 Soil Preparation

Prior to seeding, all surface soils shall be loosened to a minimum depth of 300 mm and broken up to a fine, workable texture suitable for seeding.

1.6.12.2 Seeding and/or Sodding

Turfed areas within the playground fencing shall be seeded with a Fine Leaf Tall Fescue seed mixture and be irrigated with temporary irrigation systems. The playground turf (to include all turf inside fences) shall be established and ready for use prior to completion of contract. The contractor has the option to Sod the playground area.

Areas outside the fencing shall be seeded with the same mix and have only temporary irrigation to establish the turf. All other areas, including those disturbed by contractor's staging activities, not otherwise surfaced, shall be seeded the same. All newly turfed areas shall be fertilized with 18-46-0 fertilizer at the rate of 2.25 kg per 100 square meters per acre (4.6 lbs per 1,000 square feet). All seeded areas shall be seeded by hydromulching techniques using 34 kg of green-tinted wood-fiber hydromulch per 100 square meters (75 pounds per 1,000 square feet) drilling with a Brillon-type seeder or broadcast seeded.

Seeding shall be specified in accordance with Section 02000 of this RFP document and UFGS Section 02921A SEEDING.

Sodding shall be specified in accordance with UFGS Section 02922A SODDING.

1.5.13 Fence and Gates

- a. Playground fence shall be located as shown on the attached Site Plan. The fence shall be 1.8 m high with top and bottom rail. All attachments shall be turned out to avoid sharp edges which could injure children. Where the two play areas meet threads and ties must be coated with silicon on sharp edges. Chain Link fencing shall be specified in UFGS Section 02821 FENCING.
- b. Double-swing gates for emergency vehicle access shall be a minimum of 3.6 m wide. Single swing personnel gates shall be a minimum of 1.2 m wide. The height of the gates shall match the fence. Gates shall be specified in UFGS Section 02821 FENCING.
- c. All chain link fence shall have a concrete mow strip installed no more than 25 mm below the bottom rail. The mow strip shall be 150 mm deep by 300 mm wide with two No. 13 bars running parallel to the fence line. The top 150 mm of the fence post base shall be 300 mm by 300 mm square to accommodate the placement of 12.7 mm preformed expansion joints on each side of the fence post foundation.

1.5.14 CONSTRUCTION AREA FENCING

The Contractor shall maintain a 6' high chain link fence around the building construction area. Chain Link fencing shall be specified in UFGS Section 02821 FENCING. Tensar Orange safety fence can be used around the parking lots and utility construction. Upon completion of construction, all fence materials shall be disposed of outside the limits of Government-controlled lands.

1.6 Exterior Gas Distribution

A new service line shall be provided and connected by tapping into the existing gas line located east of the exisitng Youth Activity Center. Gas line shall extend to the west and turn south between the new and existing facilities. Service lines to buildings shall run parallel and/or perpendicular to the building lines, shall be buried at least 450 mm below the ground surface, shall not be laid in the same trench with other utilities, and shall be above other utilities whenever they cross. Gas lines shall not be laid under paved streets, parking lots, roads or in other locations subject to heavy traffic whenever practicably avoidable and economically feasible to locate elsewhere. Whenever it is necessary to locate gas lines in such locations, the lines shall be protected by suitable encasement or by burying to a depth to provide at least 1.25 meters of cover over the top of the pipe except that gas lines shall be provided with encasement when laid under new or existing paved streets, and parking lots. The tap into the existing line shall be a "hot tap" and the Installation's Fire Department shall be given 30 days advance notification of the date of the tap. The point of connection shall be provided with a shutoff plug valve, conveniently located outside of any traffic area and protected with a valve box. Service lines shall not be installed under or routed thru the facility. Except for piping located at the new gas meter/service regulator assemblies, no aboveground gas piping shall be exposed to view. The service line shall enter the building in an accessible location outside the mechanical room. The gas meter/service regulator assemblies shall be hidden from view to the greatest extent possible.

1.7 Exterior Water Distribution

Water service line shall tap into the existing 200 mm water line located east of Longstreet Drive. The water line shall extend west to the Child Development Center and turn south between the new and existing facility. Pressure and flow data tests are not available for the new line. The Contractor shall perform these tests prior to designing the fire protection system for the Child Development Center. See paragraphs at the end of this section relating to water service requirements.

1.8 Exterior Sanitary Sewer

Sanitary sewer connection shall be to the existing manhole located southwest of the New Child Development Center on the north side of Thomas Ave. See paragraphs at the end of this section relating to sanitary service requirements.

1.9 Exterior Electric and Communications Distribution

Location of power and communications shall be as shown on the drawings. See SECTION 01017 ELECTRICAL REQUIREMENTS for additional information and requirements.

1.10 PAVEMENTS

1.10.1 Pavement Subgrade Preparation

Excavation for roads, parking lots, and other surfaced areas shall conform to state specification section 204.

Subgrades: Subgrades for roads, parking lots and other surfaced areas shall be cleared of obstructions, organic soils shall be excavated and replace with suitable select structural backfill. Backfill shall be placed

in compacted lifts in accordance with state specifications. Subgrades shall conform to the state specification requirements for subgrades for primary roads. The subgrade for all roads, parking lots, and other surfaced areas shall be lime modified and compacted to a depth of at least 200 mm. Lime-modification of all subgrade areas shall be accomplished in accordance with state specification section 305 Lime Treated Subgrade. A minimum of 5 percent hydrated lime by weight (based on oven-dry weight of the soil) or a minimum 3.8 percent granular quicklime by weight (based on oven-dry weight of the soil)shall be used.

1.10.2 Design Traffic

1.11.2.1 Parking Areas, Access Road and Service Drive.

The design requirement is for paved traffic areas. This project involves three traffic area design requirements. (1)An access drive for school bus access (2) A parking lot for passenger cars, panel and pickup trucks and school buses. (3) Service vehicle traffic at rear of new facility.

Primary traffic includes approximately 300 to 400 passenger cars, panel and pickup trucks passes per day, approximately 14 school bus passes per day. The service drive would anticipate approximately two 6-ton trucks passes per week and approximately 1 large garbage truck pass per week. Buses shall be parked in the parking lot as shown on the site plan. Parking shall accommodate two large and two small school buses.

According to TM 5-822-5 pg 3-1, the traffic consists of Group 1, 2, and 3 vehicles. Due to daily variations in traffic the design traffic Category would be approximately Category II. The estimated daily traffic would be approximately 360 vehicle passes on average. According to Table 1 in TM 5-822-5 the surfaced traffic areas would conform to a Class E road. The primary vehicle trafficked areas at the CDC according to Table 2 in TM 5-822-5 for a Class E and Category II requires a section design index = 2. TM 5-822-5 Chapter 18 Paragraph 18-8 specifies that for roads and parking lots with a design index less than 4, state highway requirements for design and materials may be used, subject to demonstrated satisfactory performance of similar roads and parking lots in the state as determined by observation and experience.

1.10.3 Pavement Design

The Contractor shall be responsible for design of all pavements using the traffic information provided above. Pavements at Fort Riley shall be designed for seasonal frost conditions. Any additional soil data required by the Contractor shall be obtained by the Contractor at his expense.

1.11.3.1 Asphalt Concrete Pavement

Asphalt concrete (plant mixed bituminous concrete mixtures): The project includes areas to be paved with asphalt concrete (plant mixed bituminous concrete mixtures). Based on a design index less than 4, the thickness design for asphalt concrete surfaced areas shall conform to the latest recommended design procedures of the Kansas State Department of Transportation. The thickness of the asphalt concrete pavement and base course shall be designed for the traffic and loading conditions. A complete and detailed copy of the thickness design procedure shall be submitted with the section design analysis. The design procedure and analysis shall be submitted for review prior to construction of the roads and parking lots.

The section shall consist of a compacted asphalt concrete surface course on a compacted crushed aggregate base course, on a compacted lime modified subgrade. Materials and procedures used in the design and construction of asphalt concrete surfaced roads, parking lots, and other areas shall conform to state specification and the requirements herein. Construction of asphalt concrete pavement shall conform to the state specification section 601,602, and 603. The latest edition and revisions of the state specification shall be used for all work.

Base course aggregates: Base course aggregates used for roads, parking lots, and other surfaced areas shall be crushed aggregate conforming to state specification subsection 1105, Type AB-1.

1.11.3.2 Portland cement concrete pavements: This project requires limited surface areas to be paved with Portland cement concrete, and construction of small concrete slabs on grade. Based on a design index less than 4, the thickness design for concrete surfaced areas shall conform to the latest recommended design procedures of the Kansas State Department of Transportation. The thickness of the concrete pavement and base course shall be designed for the traffic and loading conditions. A complete and detailed copy of the thickness design procedure shall be submitted with the section design analysis. The design procedure and analysis shall be submitted for review prior to construction of the roads, parking lots, and other surfaced areas.

The pavement section shall consist of a concrete surface course on a compacted crushed aggregate base course, on a compacted lime modified subgrade. Base course aggregates used for roads, parking lots, and other surfaced areas shall be crushed aggregate conforming to state specification subsection 1105, Type AB-1.

In addition the following requirements pertain:

The maximum water/cement (cementitious) ratio shall not exceed 0.42 by weight. Aggregate shall conform to ASTM C 33 Class 5S, except that the coarse aggregate shall not show more than 40 percent loss after 500 revolutions when subjected to the Los Angeles abrasion test in accordance with ASTM C 131. The maximum allowable limit on Coal and Lignite shall be 0.25 percent. The aggregate shall meet or exceed the State Specifications requirement for Durability Class I. Portland cement concrete shall contain at least 564 pounds of Portland cement per cubic yard. Portland cement shall conform to ASTM C 150 Type I or II, and conform to the low alkali requirement. All Portland cement for use in the work shall be obtained from the same source. Class F Fly Ash may be used up to a maximum limit of $20\,$ percent of the cementitious content. Fly Ash shall conform to ASTM C 618, meeting the optional physical and chemical requirements and the limit on available alkalies, Tables 1, 2,3, and 4. Slump shall be measured at the location of placement at the form. Concrete placed using pumping methods, slump shall be measured at the discharge end of the pump line at the location of placement.

1.10.4 [Enter Appropriate Subpart Title Here]1.11.4 Rigid Pavement Joint Layout

A typical joint layout for plain concrete road intersections is shown in Figure 13-1 of TM 5-822-5. A typical joint layout for plain concrete roads and parking areas is shown in Chapter 15 of TM 5-822-5. Spacing and layout of joints in plain concrete pavement shall be such that the number of slabs

requiring reinforcement will be kept to a minimum. Odd-shaped slabs should be reinforced in two directions normal to each other using a minimum of 0.10 percent of steel in both directions. The entire area of the slab should be reinforced. An odd-shaped slab is considered to be one in which the longer dimension exceeds the shorter dimension by more than 25 percent or a slab which essentially is neither square nor rectangular. Odd-shaped slabs will generally be reinforced with steel welded wire fabric. Slabs in which a structure is placed shall also be reinforced with welded wire fabric. Each slab to be reinforced with welded wire fabric will be marked with an "R" on the joint layout plan. Details showing typical layout of joints at intersection as indicated in Figure 13-1 of TM 5-822-5 will be provided when applicable. All joints in concrete pavement shall be cleaned and sealed with a joint sealant. All concrete shall be proportioned using a maximum water/cement ratio of less than 0.42 by weight.

1.10.5 Sidewalks

P.C. concrete sidewalks shall be a minimum of 150 mm thick. Transverse contraction joint spacing shall be as follows; 1.2 m for walks 1.2 m and 2.4 m wide, 1.5 m for walks 1.5 m and 3.0 m wide, 1.8 m for walks 1.8 m and 3.6 m wide. Longitudinal contraction joints shall be constructed in sidewalk widths 2.4 m and greater. Expansion joint spacing shall not exceed 12.2 m. An expansion joint shall be provided at sidewalk intersections, between sidewalks and back of curbs, between sidewalks and vertical surfaces of structures, and between sidewalks and entrances to structures.

1.10.6 Bituminous Prime Coat

A bituminous prime coat shall be used at the option of the Contractor. Bituminous prime coat will be used when it is anticipated that the constructed base course may be damaged by rain, wind, or traffic prior to placement of the bituminous concrete pavement.

1.10.7 Bituminous Tack Coat

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous material. Tack Coat shall conform to KDOT specifications.

1.11.8 Unimproved Road

Unimproved Fire Lane shall be graded and compacted the same as for a subgrade on an improved road and according to the requirements that shall be specified in the UFGS guide specification Section 02300 EARTHWORK.

1.10.8 Joint Sealing

Joints in P.C. concrete pavements may be sealed with field molded sealants and specified in accordance with The Kansas Department of Transportation, "STANDARD SPECIFICATIONS FOR STATE ROAD AND BRIDGE CONSTRUCTION".

1.10.9 Concrete Sidewalks, and Curbs and Gutters

Concrete sidewalks and curbs and gutters shall be specified in accordance with The Kansas Department of Transportation, "STANDARD SPECIFICATIONS FOR STATE ROAD AND BRIDGE CONSTRUCTION".

1.11 GRADING

1.11.1 General

Positive drainage shall be provided for all areas and existing drainage ways shall be utilized to the extent possible. It is mandatory to direct drainage away from buildings to curb and gutter and/or overland to the existing perimeter ditch located on the exterior of the site. Swales between buildings and parking areas shall be avoided, if possible. Parking areas shall be graded such that storm water is directed off to the sides and not down the center of the parking area. Drainage along the new entrance drive shall be controlled by the use of curb and gutter and drainage structures. Earthwork shall be balanced to the extent possible without compromising the design.

1.11.2 Borrow and Waste

Borrow material shall be obtained from locations on Fort Riley shown on the drawings. Excess waste material shall be disposed of by the Contractor at the locations indicated on the drawings.

1.11.3 Sidewalks

Concrete walks shall have a transverse grade of 2 percent. A desirable maximum longitudinal walk grade will be 4 percent with an abolute maximum of 8 percent. Handicapped accessible walks with a longitudinal slope greater than 5 percent shall be considered a ramp. See FED STD 795 Uniform Federal Accessibility Standards for ramp requirements. Special attention shall be given to sidewalks that are on the north (shaded) side of buildings. These walks should be designed to ensure a freeze/thaw cycle does not result in the formation of ice on the walk. Ice on walks should be a safety consideration for all areas. The use of steps in walks will be avoided whenever possible. The use of single riser steps is especially discouraged. When steps are unavoidable, they should have at least three risers and will be provided with handrails.

1.11.4 Transverse Parking Area Grades

- a. Desirable minimum of 2 percent.
- b. Absolute minimum of 1.5 percent for flexible pavement and 1 percent for rigid pavement.
- 1.11.5 Longitudinal Parking Area Grades

Maximum of 4 percent.

1.11.6 Ramp Grades

- a. Desirable maximum of 6 percent.
- b. Absolute maximum of 8 percent for short distances only.

1.11.7 Gutter Grades

- a. Desirable minimum of 0.8 percent.
- b. Absolute minimum of 0.5 percent.

1.11.8 Building Floor Elevation

Building finished floor elevation shall be set to match the existing Youth Activity Center Facility.

1.11.9 Grades Away From Building

- a. Minimum of 3 percent for 3 m. Grades between buildings can be less than the minimum due to the close proximity of the structures. Care shall be taken in the design to ensure that this area drains properly. Consideration shall be given to the use of area inlets, trench drains, etc. to provide adequate drainage.
 - b. Maximum of 10 percent for 3 m.

1.11.10 Overlot Grades

Provide positive drainage for all areas.

- a. Minimum 1 percent for cohesionless sandy soils.
- b. Minimum 2 percent for cohesive soils or turfed areas.
- c. Sideslopes for ditches, roads, and other turfed areas shall be no steeper than 1V on 3H.

1.11.11 Adjustment of Existing Structures

All manholes, valve boxes, handholes or inlets of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where inlets, manholes, valve boxes, or handholes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions.

1.12 STORM DRAINAGE

1.12.1 Determination of Storm Runoff

For areas of up to about 2 square kilometers, where only peak discharges are required for design and extensive ponding is not involved; the computation of runoff may be accomplished by the Rational Method. For larger areas, when suitable unit-hydrograph data are available or where detailed consideration of ponding is required, computation should be by unit-hydrograph and flow-routing procedures. Sizing of storm drainage systems shall be based on rainfall of 10-year frequency.

1.12.1.1 Design Storm Return Period

Storm drains and culverts shall be sized for a design storm with a return period of 10 years. Provisions shall be made to protect all buildings and critical structures from a major storm with a return period of 100 years.

1.12.1.2 Rainfall Depth-Duration-Frequency Data

Rainfall data for states in the western United States shall be obtained from NOAA ATLAS 2. Rainfall intensity-duration data developed by cities or regions may be used if available.

1.12.2 Storm Drainage System Layout

The Contractor shall be responsible for the complete design of the storm drainage system. The new storm drainage system shall be coordinated with surrounding properties to ensure runoff does not cause damage to the other properties. Sheet flow shall be the prefered way of draining the playground areas and for all of the parking area. Drainage along the new entrance drive shall be controlled by the use curb and gutter, inlets, culverts, storm drains, and ditches. Erosion control shall be provided for all storm drain structures. The Contractor shall provide details for all drainage structures. Under no circumstance shall storm drain lines be located beneath buildings.

1.12.2.1 Manholes

Diameter of manholes shall be large enough to accommodate pipes entering and exiting the manhole. No ladders or steps are to be provided.

1.12.2.2 Headwalls and Flared End Sections

Unless otherwise approved, headwalls or flared end sections shall be provided at the entrance and ends of culverts and at storm drain outfalls. Outlets and endwalls shall be protected from undermining, scour, lateral erosion.

1.12.2.3 Culverts

Culvert pipes shall have a minimum diameter of 450 mm wherever possible.

1.12.2.4 Roof Drain Outfall Lines

Downspouts and/or roof drains from the Child Development Facility shall be connected to an underground roof drain system. Roof drain outfall lines beyond 1.5 m from the building shall be of the same materials as the exterior storm drainage system. Minimum diameters shall be 300 mm for lengths over 15 m and 200 mm for lengths under 15 m. In addition, the diameter shall be at least 50 mm larger than the diameter of the line as it leaves the building. All changes in direction of outfall lines shall occur at storm drain structures except that cleanouts may be used in lines smaller than 300 mm.

1.12.3 Storm Drain and Culvert Pipe

The Contractor shall select the appropriate storm drain and culvert pipe materials from the options specified in UFGS Section 02630 STORM DRAINAGE SYSTEM. Pipe, bedding, and backfill shall be of adequate strength (or stiffness) to support the earth, live, and construction loads imposed on the pipe. Only pipe materials which have a minimum design service life of

25 years shall be allowed for permanent installations. As a minimum, all pipe joints shall be soiltight. The Contractor shall specify watertight joints when the water table is at or above the pipeline.

1.12.3.1 Concrete Pipe

Reinforced concrete pipe shall be a minimum Class III. Type I cement may be used only when sulfates in the soil are 0.1 percent or less and dissolved sulfates in the effluent are 150 ppm or less. Type II cement may be used only when sulfates in the soil are 0.2 percent or less and dissolved sulfates in the effluent are 1,500 ppm or less. Only Type V cement may be used if sulfates in the soil exceed 0.2 percent or dissolved sulfates in the effluent exceed 1,500 ppm. Concrete culverts and storm drains shall be protected by a minimum of 1.0 m of cover during construction to prevent damage before permitting heavy construction equipment to pass over them during construction.

1.12.3.2 Corrugated Metal Pipe

The service life of corrugated metal pipe shall be the sum of the lives of the nonmetallic protective coating, the metallic protective coating, and the basic metal pipe. The life of the basic metal pipe and metallic protective coating shall be the time to first perforation. The time to first perforation for corrugated steel pipe shall be determined using the California Chart (California Division of Highways Test Method 643-B). Corrugated metal pipe shall not be allowed in areas where previous satisfactory service has not been achieved. Zinc-coated corrugated steel pipe shall not be allowed if the soil and water pH is less than 6 or greater than 8 or the minimum soil resistivity for the site is less than 2,500 ohm-cm. Aluminum-coated corrugated steel pipe shall not be allowed if the soil and water pH is less than 6 or greater than 9 or the minimum soil resistivity for the site is less than 1,500 ohm-cm. Stiffness of the corrugated metal pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 5.0 percent. Corrugated metal culverts and storm drains shall be protected by a minimum cover as recommended in Section 26 of AASHTO HB-16 during construction to prevent damage before permitting heavy construction equipment to pass over them during construction.

1.12.3.3 Plastic Pipe

Stiffness of the plastic pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 7.5 percent. Plastic culverts and storm drains shall be protected by a minimum of 1.0 m of cover during construction to prevent damage before permitting heavy construction equipment to pass over them during construction. Split couplers shall not be allowed for corrugated high-density polyethylene pipe.

1.13 TRAFFIC SIGNAGE AND STRIPING

Traffic signage and striping shall be provided for all new roads and parking areas. Signage and striping shall be designed in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways.

1.14 EROSION AND SEDIMENT CONTROL

The Contractor shall be responsible for selecting and implementing Best Management Practices (BMPs) to minimize pollutants in storm water discharges associated with construction activity at the construction site.

All erosion and sediment measures and other protective measures shall be maintained by the Contractor in effective operating condition. All temporary structural practices shall be removed once the corresponding disturbed drainage area has been permanently stabilized. NPDES permit shall be required in accordance with the Kansas Department Of Health & Environment. Permit is required as area disturbed is over 5 acres. Permit can be obtained from industrial programs, stormwater program at (785) 296-5547. The internet website address is http://www.kdhe.state.ks.us/stormwater/index.html.

1.14.1 Temporary Construction Entrance

Tracking of mud from the construction site onto adjacent roads and streets shall be kept to a minimum. A temporary stabilized stone pad shall be constructed at points where vehicular traffic will be leaving the construction site and moving directly onto a paved road or street. It shall extend the full width of the vehicular ingress and egress area and have a minimum length of 70 feet. The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto adjacent roads or streets. If conditions on the site are such that the majority of the mud is not removed by the vehicles traveling over the stone, then the tires of the vehicles shall be washed before entering the road or street. Any mud which is tracked onto roads or streets shall be removed at least once daily.

1.15 COMPOSITE UTILITIES

The Contractor shall not run utilities underneath buildings. The Contractor shall avoid running utilities underneath streets and parking lots where practicable. In cases where it is necessary for the utilities to cross existing streets, the Contractor shall install the lines by trenchless excavation methods. No open trenching will be allowed through existing streets, unless written permission is obtained and approved by Fort Riley.

1.15.1 Service Line Tracer Wire

For new underground non-ferrous service lines are installed, the service lines shall be identified by a tracer wire to permit locating with a metal detector. Tracer wires shall be 12 gauge AWWG copper wire. The tracer wire shall be installed 150 mm above the pipe.

1.15.2 Service Line Warning

New below grade lines shall be identified by placing a continuous plastic warning ribbon in the trench such that any excavation shall uncover the ribbon prior to reaching the line.

1.15.3 UTILITIES LOCATED IN PLAY AREAS

- a. Only cold, potable water will be provided.
- b. Provisions for utility metering, transformers, and other electrical equipment will be located outside the play area.
- c. Any drainage grates will be locked.
- d. Utility boxes will be locked and located outside the play area.

1.15.4 CATHODIC PROTECTION

Corrosion protection shall be provided for all buried gray or ductile-iron piping, fittings, valves, and other water line appurtenances, regardless of pipe material. Corrosion protection shall consist of an anode type cathodic protection system. See SECTION 01017 ELECTRICAL REQUIREMENTS.

1.15.5 WATERLINES

- a. Waterlines shall be designed and constructed in accordance with the combination of the State of Kansas Department of Public Health and Environment's "Design Criteria for Potable Water Systems (Revised March 31, 1997) "and the Corps of Engineers Guide Specifications, Technical Manuals (TM), Engineering Manuals (EM), Military Handbooks (MH), and the industry standards listed herein. In the event of conflict, the Contractor shall follow the Local or State requirements/criteria (whichever are more stringent) which govern the waterlines. In addition to the State of Kansas criteria listed above, water distribution systems and service lines shall be designed and constructed in accordance with TM 5-813-5, TM 5-813-7, and UFGS Section 02510 WATER DISTRIBUTION SYSTEM. The Contractor shall be responsible for protection of existing waterlines. If any potable waterlines are damaged during construction, the Contractor must immediately notify the Contracting Officer. The Contractor shall disinfect all new water lines and any remaining lines which do not remain fully pressurized during construction or connection. The Contractor shall notify the Contracting Officer 7 days prior to disinfection of the water lines. The disinfection shall be in accordance with the American Water Works Association Standard AWWA C651, and shall not be considered complete until two consecutive days of bacteriological samples show no contamination. All bacteriological, lead and copper tests shall be performed by Environmental Protections Agency (EPA) certified laboratories. Copies of results of the analyses shall be forwarded to the Contracting Officer upon receipt.
- b. The Contractor shall design and provide all facilities required to deliver water to the project. Service connections or extensions to the existing water distribution system shall be made without interruption to service. Sizing of the domestic water service lines for the new facility served shall be determined in accordance with the National Standard Plumbing Code Fixture Count Method. For design of the waterlines, use maximum Hazen-Williams "C" value of 130 for plastic pipe and 120 for other pipe materials.

1.15.5.1 Water Distribution and Service Lines

a. Flow Requirements

Water shall be supplied by service lines of appropriate capacity to provide the flows determined to be necessary to meet all requirements of the new facility. The requirements for sizing the water lines include all domestic use, and interior and exterior fire protection water, as required. All new distribution lines shall be tied into the existing 200 mm water line discussed above.

b. Service Connections

A maximum velocity of 3.048 meters per second shall be used for metallic

piping and 1.5 meters per second shall be used for nonmetallic piping. Service connections shall be made via corporation stops, appropriate gooseneck connections, or tapping sleeves and valves. The number and maximum size of corporations stops shall be as specified in the UFGS Section 02510 WATER DISTRIBUTION SYSTEM.

c. Dewatering, Hydrostatic Testing, and Flushing of Lines

The Contractor shall be responsible for implementing the terms and requirements of SECTION 01355 ENVIRONMENT PROTECTION for dewatering, hydrostatic testing, and flushing of lines after disinfection.

d. Domestic Service Stop Valve

Building shall be provided with separate service and stop valves in areas readily accessible to maintenance and emergency personnel.

1.15.5.2 Dedicated Fire Water Service Lines

a. Fire Flow Data

Hydrant flow data for existing hydrants is given in Section 01800 Fire Protection. For determination and documentation of fire protection, the Contractor shall verify the information provided. Data to be recorded with the flow tests are static pressures, residual pressures, flowrates, pump status, date and time tests were conducted, and name of personnel conducting the fire hydrant flow tests. The static pressures, residual pressures, flowrates, test hydrant and flow hydrants shall be shown on the appropriate contract drawings. Fire hydrant flow tests required for fire protection design shall be made in accordance with the procedures specified in AWWA M17, (Installation, Field Testing, and Maintenance of Fire Hydrants). The Contractor shall coordinate with the Fort Riley Fire Department and PW (Public Works) prior to conducting such tests. The Contractor shall submit verification of fire hydrant flow test data provided with the design calculations.

b. Fire Hydrants

The Contractor shall be required to install fire hydrants for the new facility. One fire hydrant shall be located within a minimum of 45 m of the building fire department connection. All other hydrants shall be located in accordance with Military Handbook MH 1008C. Fire hydrant styles shall meet the requirements of Fort Riley.

c. Dedicated Fire Line

The Contractor shall be required to provide a separate fire water service line to the building for interior fire sprinkler protection in accordance with NFPA 24, and Military Handbook (MH)1008C. The fire water service line to the building shall be equipped with a Post Indicator Valve (PIV) that can be readily located by the fire department. The PIV shall not be placed closer than 12 m to the building it is serving and shall be provided with a tamper switch connected to the building fire control panel. The PIV shall be protected by 150 mm steel pipe bollards, filled with concrete, painted and spaced in accordance with Fort Riley requirements.

1.15.6 WASTEWATER

Wastewater lines shall be designed and constructed in accordance with the

combination of the State of Kansas, Dept. of Health and Environment," Design Criteria Considered in Review of Wastewater Treatment Facilities, Policy 96-1" and the Corps of Engineers Guide Specifications, Technical Manuals (TM), Engineering Manuals (EM), Military Handbooks (MH), and the industry standards listed herein. In the event of conflict, the Contractor shall follow the Local or State requirements/criteria (whichever are more stringent) which govern the wastewater lines.

1.15.6.1 Design Criteria

In addition to the State and Local criteria listed above, the sewage system shall be designed in accordance with TM 5-814-1, TM 5-814-2, and UFGS Guide Specification Section 02531 SANITARY SEWERS The Contractor shall field verify the location of the existing sanitary sewer system, the sanitary sewer system capacity and invert elevations to ensure that it is adequate for the flows generated by the new facilities. No interruption of service shall be allowed on the existing sanitary sewer line. The Contractor shall coordinate the sequencing of construction as it affects the existing sanitary sewer line with the Contracting Officer. Exterior building sanitary sewer service lines shall be 150 mm minimum diameter. All design slopes will be calculated using the Manning formula. The Contractor shall provide all calculations.

1.15.6.2 Manholes

Manholes are required at all changes of direction, slope, and size. Manholes shall be spaced not more than 150 m apart. Avoid placing manholes where the tops will be submerged or subject to surface water inflow. Where the invert of the inlet pipe would be more than 450 mm above the manhole floor, a drop connection will be provided. The Contractor shall provide all calculations.

1.15.7 Sewer Mains

The peak diurnal and extreme peak flowrates shall be calculated according to TM 5-814-1. Curved sewers are prohibited. Pipes shall be designed to provide a minimum velocity of 0.6096 meters per second at the average hourly flowrate, and a minimum velocity of 0.762 to 1.067 meters per second at the peak diurnal flowrate. Maximum velocity shall be 3.048 meters per second.

1.15.8 Exterior Gas Distribution

This Section contains instructions and engineering requirements relating to the design of the new exterior natural gas distribution system where required, including the building gas service lines and gas service regulator and meter assemblies. The line to the building shall be sized by the Contractor (see minimum service line sizing paragraph Service Line Sizing). The gas distribution systems shall be designed in accordance with NFPA-54, and shall meet the requirements of UFGS Section 02556A GAS DISTRIBUTION. See SECTION 01016, MECHANICAL REQUIREMENTS for additional information and requirements.

1.15.8.1 Service Line Pressure

Natural gas shall be distributed to the building at about 275 kPa. The designer shall verify the actual gas pressure in the existing gas main.

1.15.8.2 Manholes or Valve Boxes

All manholes, or valve boxes of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions. All structures shall be of a type suitable for the intended use and shall conform to the requirements of the applicable section of these specifications.

1.15.8.3 Service Line Sizing

The size of the service lines shall be sufficient to supply the demand without excessive pressure drop and shall not be less than 25 mm in size.

1.15.8.4 Service Line Materials

All new service lines shall be underground and shall be polyethylene. All aboveground lines at the meter set assembly shall be steel as specified in UFGS Section 15190A, GAS PIPING SYSTEMS and Section 01016, MECHANICAL REQUIREMENTS.

1.15.8.5 Cathodic Protection

Cathodic protection shall be provided for all underground metallic piping and fittings except cast iron. Design of cathodic protection system shall in accordance with Section 01017 ELECTRICAL REQUIREMENTS, paragraph entitled "Cathodic Protection".

1.15.8.6 Gas Meters

A new gas meter shall be provided as part of the new service regulator assemblies. Meters shall be provided with a direct non-resettable, digital readout. Meters shall have a pulse switch initiator capable pulse output of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments or 4-20 mA output. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. It shall provide not less than one pulse per 2.8 cubic meter of gas. Meters shall be connected to the EMCS.

1.16 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

1.16.1 Trenches

A trenchless excavation method shall be required when an underground utility line crosses any roadway. Sewer and water lines, mains or laterals, shall be placed in separate trenches. The separate trenches shall maintain a minimum horizontal separation of 3 m and the bottom of the water line shall be at least 450 mm above the top of the sewer. Sewers crossing above potable water lines shall maintain a vertical separation of 450 mm and must be constructed of suitable pressure pipe or fully encased in concrete for a distance of 3 m on each side of the crossing.

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Bedding and initial backfill material shall be in accordance with the manufacturers recommendations. Where no manufacturer's installation manual is available, trench walls shall be excavated to a stable angle of repose as required to properly complete the work. Trench

excavations shall adhere to requirements prescribed in EM 385-1-1, September 1996, Safety and Health Requirements Manual. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. Excavation, trenching, and backfilling shall be performed in accordance with the UFGS Section 02316A EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES SYSTEMS.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION 01013

ARCHITECTURAL BUILDING REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The codes and referenced design publications listed below shall be used as sources of criteria for the architectural design. The most current edition of the code or standard shall be used as criteria for the design unless supplied with a date as listed here. The criteria from these sources may be supplemented but not supplanted, by applicable criteria contained in nationally recognized codes and standards.

DEPARTMENT OF THE ARMY

TI-800-1 Design Criteria

TM 5-803-5 (Mar 81) Installation Design

Design Guide Installation Design Guide, Fort Riley,

Kansas

BRICK INSTITUE OF AMERICA

Tech Note 28B Brick Veneer / Steel Stud Walls Nov. 1999

DEPARTMENT OF DEFENSE

MIL-HDBK-1008C (10 Jun 1997) Fire Protection for

Facilities Engineering, Design, and

Construction

DoD-Standard (Jan 2002) Department of Defense

Antiterrorism Standards for buildings

Federal Standards (FED STD)

FED STD 795 (April 1988) Uniform Federal Accessibility

Standards, Available at www.access-board.gov

ADAAG (January 1998) ADA Accessibility

Guidelines for Buildings and Facilities,

Available at www.access-board.gov

OSHA Occupational Safety and Health Standards

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS

UBC-1997 Uniform Building Code, 1997

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA-101

Life Safety Code, 2000

FEDERAL EMERGENCY MANAGEMENT AGENCY

FEMA 361

Design and Construction Guidance for Community Shelters. (July 2000)

1.2 GENERAL

The architectural component of the Child Development Center for School Age Children (CDC) is a single story building with a connector to the existing Youth Activity Center (YAC). The building exterior elevations reflect the interior functional areas of this facility with the central atrium area having a clerestory for natural lighting of the interior of the building. The atrium areas provide a central core and the major circulation node for the facility. The administrative and support portions of the building are on the east side of the building, which allows easy access between the CDC and the Youth Activity Center (YAC) and access to the service entrance of the site. The Activity Rooms designated for the more sedentary activities are located at the front of the building. The Activity rooms designated for the more physical activities are located on the west side of the building, oriented towards the outdoor play area. The large multipurpose room is located on the North side of the building oriented to the outdoor sports field. The exterior features shall reflect the base standards for facilities located on the Custer Hill area as described in the Installation Design Guide, Fort Riley. Building materials for the exterior of this facility shall match the building materials on the Youth Activity Center that is located adjacent to this project.

The major functional activities included in the building are: child activity rooms, central atrium, multipurpose room, administrative area with lobby/reception, kitchen, laundry and storage. Primary support spaces include the janitor closet, toilet rooms, mechanical, electrical, and communication spaces.

The layout of the floor plan and elevations are conceptual and require refinement and adjustments based on basic building structure, equipment selections and circulation. The building is approximately 2176 square meters (23,420 square feet) gross. THE NET AREAS SHOWN ON THE ATTACHED TABLE SHALL NOT BE REDUCED.

Columns shall not be allowed within any of the room spaces as laid out on the enclosed floor plans, unless otherwise shown on the drawings. Pilasters and in-wall columns which protrude into the room spaces and intefere with activities and or furniture placement are not acceptable.

Design of this project is in hard metric units. Design of the project in English units and then conversion to metric is not allowed. Any concrete masonry units and/or concrete walls used in this buildings shall be developed on a standard masonry metric module. Metric masonry module design shall be developed to result in as few cut blocks as possible. Masonry structural properties shall comply with requirements outlined in Section 01015 STRUCTURAL REQUIREMENTS.

1.3 DESIRED IMAGE AND ARCHITECTURAL COMPATIBILITY

The contractor shall verify all existing conditions and dimensions during design and prior to construction.

The building shall fit the site and be compatible with the surrounding environment. Building facades and elevations shall be similar in appearance to the enclosed elevation drawings and compatable with the Youth Activities Center, which is adjacent.

The composite floor plan is provided on enclosed sheet labeled A1.1 The facility design is based upon standard metric units. The facility is designed in accordance with Department of the proposed Army Standard Design for Child Development Centers for ages 6 - 10. Criteria from this standard has been used as the basis for the design of the facility.

Overall height of this facility is a single story building with a taller clerestory area above the central atrium and gathering area, Building facade and elevations shall match the appearance provided in the enclosed elevation drawings.

Interior materials and finishes shall comply with the requirements specified in Section 01014 INTERIOR DESIGN REQUIREMENTS.

1.4 DESIGN CRITERIA

The technical sections provided shall serve as the minimum design standards established for this project. Design publications listed in each section shall be used as sources of criteria for design. The criteria from these sources may be supplemented, but not supplanted, by applicable criteria contained in nationally recognized codes, standards, and specifications. The basic US Army Corps of Engineers design guidance is contained in TI-800-1, Design Criteria, TM 5-803-5, Installation Design, and the Design Guide, Installation Design, Fort Riley.

1.4.1 Fire Safety

The initial basis for determination of building structure type and building area is the MIL-HDBK-1008C. This will direct the designer to the appropriate area of the UBC-1997 and NFPA-101. Fire separation walls and egress from the facilities shall meet or exceed the requirements of NFPA-101. Also see Section 01018 FIRE PROTECTION REQUIREMENTS of this document. This facility will be completely fire sprinklered as part of the requirement.

1.4.2 Occupational Safety and Health

Building design shall comply with OSHA, Occupational Safety and Health Standards criteria for all items which must be included in the design to ensure safety compliance.

1.4.3 Handicapped Accessibility

The facility shall be in compliance with the requirements of the Uniform Federal Accessibility Standards (UFAS), FED STD 795 and Americans with Disabilities Act, ADAAG. In situations where conflicts exist between UFAS and ADA requirements, the more stringent requirement shall govern. Spaces designed for children shall meet child development criteria and the Architectural and Transportation Barriers Compliance Board (ATBCB), Recommendations for Accessibility Standards for Children's Environments, dated January 1992.

1.5 TECHNICAL SPECIFICATIONS

The government provided technical specifications, Unified Facilities Guide Specifications (UFGS) are available at the website identified in Section 01331, SUBMITTALS DURING DESIGN. These specifications shall be completely edited by the contractor's design agent and fully coordinated with the drawings to accurately and clearly identify the products used in construction and their installation requirements.

The provided specifications define the minimum requirements and level of quality for items of equipment, materials, installation, and testing that shall be provided for the facility. Where items of equipment, materials, installation, or testing requirements are not covered in the provided specifications; special sections or within each guide specification a new specifications sections shall be prepared by the contractor to cover those subjects.

1.6 TYPE AND METHOD OF CONSTRUCTION

1.6.1 Facility Construction

This facility shall be designed as permanent construction. The definition of permanent construction per MIL HDBK 1190; "Buildings and facilities designed and constructed to serve a life expectancy of more than 25 years, should be energy efficient, and must have finishes, materials, and systems selected for low maintenance and low life-cycle cost". In accordance with Military Handbook 1008C, all permanent construction over 743 square meters (8000 square feet) is required to be a noncombustible structure. Wood construction shall not be permitted.

1.6.2 Exterior Walls and Finish Materials

Exterior walls and finish materials shall be selected on the basis of architectural compatibility and appearance in accordance with the design provided. The outside face of the exterior walls shall be composed of brick and cast stone. Exterior walls shall have a minimum insulation of Rsi=2.47 (R=14) based on aged insulation values for the opaque portion of the exterior wall construction. If steel stud backup is used in the exterior wall construction, the insulating value of the insulation material between studs must be de-rate in accordance with ASRAE 90.1 table 8C-2. In addition, brick veneer and steel stud back up shall be designed in accordance with the Brick Institutes Tech Note 28B/. The exterior materials, window and storefront glazing, and cast stone shall match those installed on the YAC.

All interior cavity thru-wall flashing shall be a metal type. A non-metal elastomeric ply sheeting is not acceptable.

1.6.3 Interior Wall Construction

All interior walls shall be permanent noncombustible construction. Steel studs when used shall be sized according to the wall heights. Framing shall be spaced at a maximum of $400 \, \text{mm}$ on center. The contractor shall design the Partition framing and furring system to be capable of carrying a transverse load of 5 PSF with out exceeding either the allowable stress or a deflection of L/240.

Interior walls requiring fire ratings shall be designed and constructed in accordance with an UL tested system. Fire rated walls shall be continuous from the floor to the structural roof deck above. These walls shall allow for structural deflection of the roof structure.

1.6.4 Floors

All interior structural slabs shall be consistent in thickness in any one room. Floors containing floor drains shall be constructed to slope to the drains.

1.7 EQUIPMENT AND FURNISHINGS

1.7.1 Contractor Furnished and Installed Equipment

Contractor Furnished and Contractor Installed equipment within this facility shall include all items but not limited to the following:

Toilet Accessories

Fire Extinguisher Cabinets

Fire Extinguishers

Casework including control counter with under counter storage for equipment, storage cabinets, and drawers

Ballet Bars and Mirrors

Miscellaneous Shelving in Janitor's Closets, storage rooms, kitchen and scullery.

Mop Sink

Laundry sink

Information board located near control counter

Key storage cabinet

Laundry equipment hook-ups, for 1 commercial washer and 1 commercial gas dryer

Kitchen equipment as listed in the drawings and specifications Wood and metal lockers

Walkin Refregerator and Freezer

1.7.2 Government-Furnished and Contractor-Installed Equipment

The government will provide the following equipment and the contractor shall install it in this facility: No Government furnished, contractor installed equipment.

1.8 SOUND AND VIBRATION CONTROL

1.8.1 Wall Construction

Construction methods, materials, and finish materials shall be selected to impede transmission of the human voice and equipment vibrations. Noise generating equipment and activity centers shall be isolated through conventional methods where possible. Utilization of equipment isolators, construction of full height walls, stud staggering, and offsetting of receptacles and other wall penetrations shall be used to limit sound transmission. All interior walls shall extend up to the underside of structural deck. Walls surrounding Activity Rooms shall have a minimum Sound Transmission Class (STC) of 50. Walls surrounding the laundry room, offices, staff, and training, etc as well as walls between child activity rooms shall be full height with sound attenuation insulation batts.

1.8.2 Sound Absorption

Installation of sound absorption materials and other techniques shall be

used throughout the facility to reduce noise reverberation. Special attention shall be given to noise reduction in the Atrium and multipurpose room.

1.9 PHYSICAL SECURITY

Conventional security measures, such as: door locking hardware, shall be incorporated into the facility design and development. See specific paragraphs in this section for additional security criteria.

1.10 ECONOMY AND VALUE OF BUILDING CONSTRUCTION

1.10.1 Economy

All materials shall be readily available within the local area, as shall sufficient trades to construct the building. Special or unique forms of construction should avoided, where skilled workers within the local area are not readily available.

1.10.2 Operations and Maintenance

Material selections shall be based upon reducing operation and maintenance costs. All materials shall be easy to clean and resist soiling. No material on the exterior of the building shall require field painting, except hollow metal doors and frames.

1.10.3 Life Cycle Cost

Material selection shall be based upon overall Life Cycle Cost to the Government.

1.11 TECHNICAL REQUIREMENTS

1.11.1 Exterior walls

The primary finish material for the exterior walls shall be face brick. Accents and window sills shall be cast stone. Some EIFS, Exterior Insulation and Finish System may be used above the lower roof line. Brick, and cast stone shall match the YAC in color and texture.

1.11.2 Miscellaneous Metals

1.11.2.1 Access Doors and Panels

Access doors and panels shall be flush type. Frames for access doors shall be fabricated of not lighter than 16 gauge steel with welded joints and finished with anchorage for securing into construction. Access doors shall be a minimum of 350 mm by 500 mm and of not lighter than 14 gauge steel, with stiffened edges, complete with attachments. Access doors shall be hinged to frame and provided with a flush face and a keyed operated latch. Exposed metal surfaces shall have a shop applied prime coat. Finished paint coat shall match surrounding surfaces. Panel shall be installed in unhabitable rooms (i.e., closets) and/or non-conspicuous locations.

1.11.2.2 Louvers

Detailing, location and sizing of louvers in the exterior walls shall be coordinated with the cast stone trim, window and door locations and lines.

Louvers shall be factory finished. Force protection issues require that all intake air for the HVAC system be brought into the building from above a specific height. See mechanical requirements Section 01016

1.11.3 Roof Design

1.11.3.1 Structural Standing Seam Metal Roofing

The CDC shall have a Structural Standing Seam Metal roof that shall be of the same design and color as the roof on the YAC located adjacent to CDC site. Color shall match, even if it requires a custom color from the manufacturer. The standing seam roof shall meet the requirements of specification section 07416, Structural Standing Seam Metal Roofing. The roof shall meet the load, deflection and uplift requirements of the criteria listed in section 01015.

1.11.3.2 Canopy at Court Yard (Price Option)

A canopy approximately 11 500mm by 22 200mm shall be located between the CDC and the YAC, connecting the side exit of the CDC with the main entrance of the YAC. This canopy shall be formed of a steel frame with Standing Seam metal roofing. The canopy shall meet the load, deflection and uplift requirements of the criteria listed in section 01015. The canopy columns shall have brick veneer enclosures. The underside of the canopy structure shall be covered with a factory finished metal soffit to prevent birds from nesting in exposed framework. Lighting will be provided in the soffit of the canopy.

1.11.3.3 Roof Insulation

Roofing insulation shall be a polyisocyanurate type. A minimum aged "R" value of the roofing insulation shall be Rsi=5.28 (R=30), based upon a maximum Rsi=0.98 (R-5.56) per 25 mm of thickness. Therefore, the total roofing insulation thickness shall be a minimum 150 mm.

A single ply vapor barrier shall be installed between the roofing deck and the bottom of the roofing insulation. The thickness of the vapor barrier shall be in accordance with the roofing system standard thickness.

1.11.4 Sheet Metalwork, General

Contractor shall include a quality assurance plan which includes a checklist of points to be observed, prior to start of roofing work.

Fascia shall have "V" crimps and a stable substrate as required to prevent "oil-canning" effect.

1.11.5 Windows

1.11.5.1 Exterior Windows

Exterior windows shall have aluminum thermal break frames and insulated glazing as specified in UFGS Section 08810 GLASS & GLAZING. Window installation shall meet the followingDoD-StandardAntiterrorism force protection requirements: To ensure that the full strength of the laminated glazing is engaged, frames, mullions, and window hardware shall be designed to resist a static load of 7 kilopascals (1 lb per square in) applied to

the surface of the glazing. Frame and mullion deformations shall not exceed 1/160 of the unsupported member lengths. The glazing shall have a minimum frame bite of 9.5-mm (3/8-in) for structural glazed window systems and 25-mm (1-in) for window systems that are not structurally glazed. Frame connections to surrounding walls shall be designed to resist a combined loading consisting of a tension force of 356-kNg/cm (200 lbs/in) and a shear force of 13-kNg/cm (75 lbs/in). Alternatively, use frames that provide an equivalent level of performance.

1.11.5.2 Interior Windows

Windows located in the interior walls of the facility shall be hollow metal frames. These windows shall have tempered, laminated glazing as specified in UFGS Section 08810 GLASS & GLAZING. Window frames shall be painted to match the door frames. Double window units are 1800mm X 1000mm and single units are 800mm X 1000mm. The top of the interior windows shall match the top of the interior door frames.

1.11.6 Doors

1.11.6.1 Exterior Doors

Exterior personnel doors shall be insulated, heavy duty level 3, flush hollow metal doors in accordance with specification section 08110, Steel Doors and Frames, except the main entrance doors and the exit doors from the atrium to the court yard area between the CDC and the YAC. The main entrance doors and the doors to the courtyard exit and their vestibule doors from the interior of the building shall be aluminum storefront in accordance with Specification 08120, Aluminum Doors and Frames. Exterior doors and glazing shall meet the same force protection requirments as exterior windows.

1.11.6.2 Interior Doors

Interior doors shall be solid core wood in accordance with specification section 08210, Wood Doors. All interior doors, except those into single fixture toilet rooms shall have narrow lites. These shall be as long as practicable to allow views from child height. Frames for wood doors shall be hollow metal frames.

1.11.7 Hardware; Builder's (General Purpose)

1.11.7.1 Locks and Latchsets

All doors shall be lockable, except multiple fixture toilets and interior vestibule doors. Single fixture toilets shall have privacy locks that are operable from the out side with an emergency release. All closet doors shall be operable from the inside without use of a key. All keyed locks shall have removable lock cylinders. All doors shall have lever handles. The panic hardware exit devices on the exterior doors of vestibule 113 shall have alarmed, delay egress locks, with a keyed override.

1.11.7.2 Lock Cylinders

Provide BEST cylinders, 7 pin, Kaba Peak keyway to match the existing Fort Riley grandmaster. Each lock shall be provided with 4 change keys

1.11.7.3 Lock Trim

The doors of this facilities shall have lever handles. All exterior doors shall have panic type hardware, except doors from storage, mechanical, electrical and communications rooms.

1.11.8 Keying

Locks and special key hardware shall be keyed to the Fort Riley Base master key system. The contractor shall provide construction cores. The Contractor shall meet with the Contracting Officer's Representative and the Base Locksmith prior to developing the keying schedule. A grand master keying system shall be provided for the building. All of the keys shall be keyed in one series, except the mechanical, electrical and communication equipment rooms. Locks for all mechanical, electrical, and communications equipment rooms shall be keyed to the existing Base utility keying system.

1.11.9 Auxiliary Hardware

All exterior doors shall have aluminum housed type weather seals.

All fire rated doors shall have compression type seal gasketing.

1.11.10 Finishes

Door hardware finish shall match satin stainless steel Type 630.

1.11.11 Door Hardware

1.11.11.1 Hardware Requirements

Door hardware in fire-rated walls shall comply with NFPA and other applicable criteria.

1.11.11.2 Hardware Sets

The following hardware sets listed are the minimum functional hardware requirements for each door types. Additional hardware may be required for each door type than listed below.

a. Exterior Steel Doors

(1) All single exterior personnel doors except storage rooms and electrical or communications rooms shall have the following hardware features:

Grade 1 hinges
Exit Device type 3
Overhead closer
Weatherstripping
Threshold
kickplate

The exterior door from Activity room 136 (storm shelter) shall have a 3 point locking/laching mechanism that meets the FEMA 361 requirements.

(2) All double exterior personnel doors shall have the following hardware features:

Grade 1 hinges Surface vertical rod exit devices Overhead closer (Both leafs)
Wall or Floor stops
Kick plate
Weatherstripping
Threshold

(3) All double exterior mechanical room, electrical room doors shall have the following hardware features:

Grade 1 hinges
Lockset (active leaf)
Overhead holder both leaves (grade 1)
2 Lever extension flush bolts(grade 1) (inactive leaf)
Weatherstripping
Astragal
Rain drips
Threshold

b. Interior Doors

(1)All single doors used in offices, janitor's closets, storage rooms, and activity rooms shall have the following hardware features:

Grade 1 hinges
Bored lockset (key locking capabilities - avoid self locking hardware.)
Overhead closer
Wall stops (with holder where appropriate)

(2) All single doors used public toilet rooms shall have the following hardware features:

Grade 1 hinges
Push Plate, elongated for both adult and child use
Pull with Plate, elongated for both adult and child use
Overhead closer
Wall stops (with holder where appropriate)
Kick plate

(3)All single doors used single toilet rooms shall have the following hardware features:

Grade 1 hinges
Privacy Lockset
Wall stops (with holder where appropriate)

(2) All double interior personnel doors to Multi-purpose room shall have the following hardware:

Grade 1 hinges Surface vertical rod exit devices Overhead closer (Both leafs) Wall or Floor stops Kick plates

(2) All double interior personnel doors to vestibules shall have the following hardware:

Grade 1 hinges
Push Pull bars on both sides, at adult and child height

Overhead closer (Both leafs) Wall or Floor stops Kick plates

1.11.12 Key Storage System

A recessed wall mounted key cabinet shall be provided in the Control counter area, and contain all additional keys for all areas of this building. Cabinet shall have the capacity to store a minimum of two keys for each room on an individual key hook. Key hooks shall be mounted on panels with sufficient distance between hooks that will allow easy identification and removal. Cabinet key panels shall be readily removable and capable to insert additional panels for expansion needs. Key cabinet shall have key locking capabilities. Cabinet door shall be a full height piano hinge.

1.11.13 Gypsum Wallboard

Predecorated gypsum board is not considered acceptable.

Exterior gypsum soffit board is not considered acceptable.

1.11.14 Exterior Signage

Two Building number signs and one building name sign shall be provided. These shall be located on the building as directed by the Contracting officer's Representative. Signage shall be as detailed on the Drawings.

1.11.15 Fire Extinguisher Cabinets

Fire extinguisher cabinets shall be fully recessed type with a flat metal door. Clear plastic bubble type door fronts are not acceptable. Fire extinguisher cabinets shall be located in accordance with NFPA Life Safety Code #101. Color of the cabinets shall match that of the wall.

- PART 2 PRODUCTS (Not Applicable)
- PART 3 EXECUTION (Not Applicable)
 - -- End of Section --

SECTION 01014

INTERIOR DESIGN REQUIREMENTS

PART 1 GENERAL

1.1 GENERAL FACILITY REQUIREMENTS

1.1.1 Interior Finishes and Substrates

Room and area interior finishes and wall substrate types shall be as shown on the Interior Room Finish Schedule in the government drawings unless otherwise noted in this narrative.

1.1.2 Interior Color Scheme

Prior to any submittals of interior finish color schemes, the contractor AE's interior designer shall meet with the COR and Ft. Riley Child Development Center personnel to develop an accepted general direction and basis for preliminary color schemes for the project. The accepted colors shall be reflected in all subsequent submittals.

1.1.3 Contractor Supplied Materials and Equipment

Contractor supplied finish materials and equipment shall meet the physical and performance criteria requirements listed in the outline specifications and edited technical specifications. Unless otherwise noted, all finish materials, equipment, and other items described herein shall be considered contractor supplied and installed.

1.1.4 Corner Guards

All outside corners within the facility, with the exception of ceramic tiled walls, shall be protected by surface mounted corner guards which shall extend from the top of the wall base to the finished ceiling. Profile shall be radiused (bullnosed) to reduce injuries. Reference specification Section 10000, DIVISION 10: SPECIALTIES (paragraph 1.4 SECTION 10260A, WALL PROTECTION).

1.1.5 Wall Mounted Items

All equipment, accessories, shelving, chair rails, and other items to be wall mounted shall be affixed to the wall structure and supplemental structural support shall be provided sufficient to provide a firm, sound installation in accordance with manufacturer's recommendations based on the weight of the item and any withstanding force or additional weight it is designed to support.

1.1.6 Exposed Structural Ceilings

All rooms with exposed open structure for ceilings shall have all ceiling components painted to include all structural elements, piping, conduit, ductwork, and vents to present a monolithic appearance.

1.1.7 Interior Signage

A complete system of interior signage shall be provided to include room

identification, directional, wayfinding, and building directory. Signage shall meet all ADA requirements for accessibility and all requirements provided in specification Section 10000, DIVISION 10 SPECIALTIES (paragraph 1.6 SECTION 10440A, INTERIOR SIGNAGE).

1.2 ROOM DESCRIPTIONS AND REQUIREMENTS

The required salient interior finish, equipment, and architectural features for each room based on each room's intended function and activity are as follows:

1.2.1 Vestibules (Rooms 101, 113)

1.2.1.1 Entrance Mat

Floor mat shall be a surface-mounted, ball-and-socket, roll-up, type. Floor mat system shall include a metal perimeter frame to provide smooth transition from mat to surrounding porcelain tile flooring. Entrance mat shall be maximized in size. Size and location shall coordinate with wall-hung cabinet heaters or other wall protrusions that would interfere with mat roll-up for cleaning sub floor beneath mat area. Reference government edited specification Section 12690, ENTRANCE MAT.

1.2.1.2 Porcelain Floor Tile Perimeter

Provide a porcelain tile perimeter around the entrance mat. Porcelain tile and porcelain tile installation shall meet the requirements of government edited specification Section 09310A, CERAMIC TILE.

1.2.1.3 Door Thresholds

Door thresholds shall be half-saddle or similar profile to provide smooth transition to porcelain tile flooring.

1.2.2 Lobby (Room 102)

1.2.2.1 Functional Description

The lobby/entry area shall be designed so that staff at the reception counter can monitor the flow of parents, children, and visitors to meet security/force protection requirements

1.2.2.2 Video Security Monitors

This area shall include the monitor(s) for a required Video Security Monitoring System. The monitors shall be located and positioned to be seen by both staff and parents. Reference specification Section 01017, ELECTRICAL, for technical and specification information regarding monitors.

1.2.3 Gathering Area (Room 103)

1.2.3.1 Functional Description

The Gathering Area shall be designed to support the following functions:

- A. A waiting area for parents who are picking up children or waiting to see staff members.
- B. An assembly for groups before getting on busses, etc. for field

trips.

C. Generally an area to support reading, socializing, and other, quieter activities.

1.2.3.2 Perimeter Wall

The gathering area shall be defined by a 900 mm high, partial height perimeter wall partition approximately 300 mm in depth, to dimensions and location as shown on the government drawings. The wall shall be constructed of reinforced, impact-resistant gypsum wallboard with a 13 mm solid surfacing top cap. Walls shall be curved at all outside corners with a minimum radius of 300 mm. Walls shall be capped with a minimum 305 mm wide top of formed, 13 mm thick solid surfacing material and matching 25 mm diameter bullnose edge. Solid surfacing material shall conform to the requirements listed in specification Section 06000, DIVISION 6: WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS). Both sides of the wall shall be covered with a 0.762 mm thick, semi-rigid, Acrovyn vinyl wallcovering conforming to the requirements provided in specification Section 09000, DIVISION 9: FINISHES (paragraph 1.7, SECTION 09720A, WALLCOVERINGS).

1.2.4 Atrium Areas (Rooms 104, 105, 106) General Requirements

General requirements for all atrium areas shall be as follows:

- A. Flooring. Flooring shall be vinyl composition tile and shall conform to the requirements provided in specification Section 09000, DIVISION 9: FINISHES (paragraph 1.5, SECTION 09650A, RESILIENT FLOORING). Floor tile shall incorporate patterns utilizing a minimum of 4 colors. Patterns and colors shall be sophisticated and subdued. Floor tile pattern(s) and colors shall clearly delineate the circulation (corridor/aisle way) spaces around and through the seating/play areas. Widths of these traffic areas shall not exceed 1900 mm.
- B. Wall Surfaces. All atrium wall and column enclosure substrates shall utilize a reinforced, impact-resistant gypsum wall board for the first 2400 mm (or full gypsum wall board sheet length) above the finished floor. All walls and column enclosures shall have a 900 mm high wainscot composed of a heavy-duty, tear resistant Type II vinyl wallcovering with a stain retardant finish as specified in outline specification Section 9000, FINISHES, paragraph 1.7 WALLCOVERINGS. Wainscot shall include a low profile vinyl/acrylic 100 mm high chair rail cap as specified in outline specification Section 1000, SPECIALTIES, paragraph 1.4 WALL PROTECTION.
- C. Acoustical Surface Treatment. Acoustical ceiling panels shall be augmented by acoustical wall panels and other surface finish materials with high NRC ratings and sound absorption to produce a reverberation rate of 2 or less when analyzed using the Sabine Formula. Surface hung acoustical panels or treatment shall be located and positioned to provide a uniform pattern throughout the space.

1.2.5 Atrium Area (Room 104)

1.2.5.1 Functional Description

This atrium area shall be designed for groupings of tables and chairs which

supports table games such as monopoly, chess, checkers, etc. and also creative arts. This area will also contain the lockers for the children occupying the facility.

1.2.5.2 Lockers

The metal lockers shall be a combination of single and two-tier unit configurations and shall conform to the requirements of the government edited specification Section 10500, LOCKERS. Single tier lockers shall occur at locations in front of room vision panels. Single tier lockers shall be capped as a group with a 13mm thick solid surfacing monolithic (one-piece)top to include a 25 mm bullnose front edge which overlaps the front edge of the lockers. Solid surfacing material shall conform to the requirements listed in specification Section 06000, DIVISION 6: WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS). Locker count shall be a minimum 196 individual lockers with a configuration and location as shown on the government drawings. All lockers shall be placed on a built-up base composed of treated 2x4 (50 mm x 102 mm) lumber. Locker base design shall include a recessed toe space with rubber wall base finish.

1.2.6 Atrium Area (Room 105)

1.2.6.1 Functional Description

This atrium area shall be designed to support foosball, air hockey, pool, ping-pong, or other age appropriate recreational games. Provide flush, floor accessed electrical outlets where required to support games such as air hockey or other games which require power.

1.2.7 Atrium Area (Room 106)

1.2.7.1 Functional Description

This atrium area shall be designed to support two major functions:

- A. Eating/Snack Bar Area. An eating/snack area in close proximity to the kitchen. This includes tables and chairs to resemble a shopping center food court or outdoor café. Provide ample utility connections and designated floor space location for mobile serving carts which will be filled in the kitchen, and then rolled to serving locations in the atrium eating/snack bar area.
- B. Demonstration Kitchen Area. A demonstration kitchen counter and area against the wall common to the kitchen shall be designed primarily for use by children to support the life skills aspect of Army programming. Children will use the counter space as they learn, prepare, and sample food. The demonstration kitchen shall include a pass-through window into the kitchen with a stainless steel, lockable, roll-up door.

1.2.7.2 Cabinets

Base cabinets and wall cabinets shall be provided to support the demonstration kitchen. Cabinets shall be in the location and to dimensions and configurations shown in the government drawings. All cabinet doors and drawers shall be lockable. Cabinets shall conform to the requirements of government edited specification Section 06410 LAMINATE-CLAD ARCHITECTURAL CASEWORK.

1.2.7.3 Cabinet Countertop

Countertop shall be to dimensions shown on the government floor plan, elevations and detail drawings and shall be composed of 13 mm thick solid surfacing material with a 25 mm bullnose solid surfacing material edge and coved 100 mm high backsplash. Solid surfacing material shall conform to the requirements of specification Section 06000, DIVISION 6: WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS). Countertop height shall be 813 mm above the finished floor. Countertop shall include the following plumbing fixtures:

- A. Solid surfacing undermount oval hand wash sink with stainless steel faucet and lever-type handle set.
- B. Two-compartment stainless steel sink shall include a detachable faucet with sprayer and a commercial, 3/4hp garbage disposal. Wall switch for the disposal shall be located in a position and height accessible to adults only. See specification Section 01016, MECHANICAL for plumbing fixture and garbage disposal requirements.

1.2.7.4 Countertop Wall Wainscot

Provide a 6 mm thick solid surfacing wainscot above the entire length of the coved backsplash as shown on the government drawings extending from the countertop backsplash to the underside of all wall cabinets. Score the surface to resemble wall tile. Solid surfacing material shall conform to the requirements of specification Section 06000, DIVISION 6: WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS).

1.2.7.5 Electrical/Lighting Requirements

Electrical and lighting requirements in support of the demonstration kitchen shall include, but limited to, the following. Technical requirements and specifications shall conform to Section 01017, ELECTRICAL.

- A. Wall Outlets. Provide GFI wall outlets to support several portable countertop appliances at one time, such as a microwave oven, electric mixing bowl, toaster oven, etc. Quantities and locations shall be as shown on the RFP drawings. Provide a wall outlet beneath the counter in the recessed pocket containing the under counter refrigerator.
- B. Task Lighting. Provide task lighting mounted to the underside of the wall cabinets in quantities and locations shown on the government drawings.

1.2.8 Reception Area (Room 107)

1.2.8.1 Functional Description

The reception area shall be adjacent to the entry area and shall act as the visual and electronic monitor for the flow of all children, parents, and visitors through the facility. The main feature of the reception area is a central desk/counter where staff process child related paperwork, track attendance, and act as the information desk for parents and visitors.

1.2.8.2 Central Desk/Counter

Minimum dimensions and overall configuration shall be as shown on the

government drawings. Requirements for the central counter include:

- A. Two tiers of counter height to enable both children and parents to interact with staff at a comfortable level. Children's counter shall be approximately 900 mm in length at a height of 813 mm. Transaction countertop height for adults shall be 1070 mm. Desktop height behind the transaction counter shall be 760 mm. Countertops and desk tops shall be of a sufficient size and configuration to support 2 desk-based computers with monitor, CPU, keyboard, a shared printer, phone, cash drawer, calculator, and a credit card machine and printer.
- B. Provisions for conduit, cabling, and counter equipment necessary to support an automated CYS Management System for daily tracking children in the program. Reference Section 01017, ELECTRICAL for technical information and requirements of the CYS Management System.
- C. Provisions for conduit, cabling, necessary to support office equipment and computers listed above.
- D. Built-in under counter storage beneath entire length of the countertop to include lateral file storage (for 250 children's files), computer hard drive (CPU tower) storage, general storage, drawer stack(s), and pencil drawer in configurations approved by the User.
- E. Provision for adequate kneehole space to support a desk chair at each computer station. Kneehole shall include adjustable keyboard tray with padded wrist support.
- F. Countertops and desktops shall be constructed of 13 mm solid surfacing material with 25 mm diameter solid surfacing bullnose edges and shall conform to the requirements of specification Section 06000, DIVISION 6: WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS).
- G. Cabinet casework below desktop shall be laminate-clad and shall conform to the requirements of government edited specification Section 06410 LAMINATE-CLAD ARCHITECTURAL CASEWORK.
- H. Vertical front surface of desk shall utilize a combination of materials with durable finishes to form an aesthetically pleasing surface pattern in shapes and forms which coordinates with the interior architectural design.
- I. Two fixed, undercounter shelves of sufficient size to contain and hold two self-contained, metal, lockable cash register drawers as provided by the Government. Drawer dimensions are 533 mm deep by 508 mm wide by 114 mm high. Drawer unit shall be mechanically fastened to the shelf. Both drawers shall be alarmed. Electrical requirements for alarms are described in specification Section 01017, ELECTRICAL.

1.2.8.3 Ceiling Soffit

Design and construct a ceiling soffit above and following the line of the central desk perimeter. Provide down-lighting in the soffit to provide accent and task lighting for the reception counter and desktop.

1.2.9 Isolation Area (Room 108)

1.2.9.1 Functional Description

This area shall be sized to support a single bed or cot for sick or injured children who are awaiting treatment or require staff monitoring until they are released to the parents.

1.2.9.2 Wall Treatment

Walls shall include a 900 mm high wainscot of a durable, non-porous, scrubbable material that is impervious to blood and other fluids associated with a sick room area.

1.2.10 Clerk Station (Rom 109)

1.2.10.1 Functional Description

This area will function as the location for the TV monitoring equipment which requires staff operation such as the VCR recorders. It will also provide a semi-private area for a desk or workstation (N.I.C. furniture item) where staff responsible for time and record keeping will accomplish this task.

1.2.10.2 Equipment Racks

Based on the equipment type, size, weight, and quantity, wall-mounted racks or shelving in sufficient size and quantity to support the TV monitoring video equipment shall be provided. Provide added structural wall support as needed to support the anticipated weight.

1.2.11 Toilet (Room 110)

1.2.11.1 Functional Description

This room functions as a toilet for sick or injured children being detained in the isolation area.

1.2.11.2 Plumbing Fixtures

Plumbing fixtures shall consist of a wall mounted flush valve toilet and wall mounted porcelain sink. Mounting heights shall be adult standard. Reference Section 01016, MECHANICAL for technical requirements.

1.2.11.3 Toilet Accessories

All accessories shall be stainless steel and conform to the requirements of outline specification Section 10800, TOILET ACCESSORIES. One each of the following accessory types shall be provided:

- A. Wall mounted, recessed double-roll toilet tissue dispenser.
- B. Wall mounted, surface mounted soap dispenser above the sink.
- C. Wall mounted, framed mirror above the sink.
- D. Wall mounted, semi-recessed paper towel dispenser and waste receptacle.

1.2.11.4 Light Fixtures

Lighting requirements for this room shall include a surface mounted

fixture located in the center of the ceiling and a surface-mounted mirror light located horizontally above the mirror. reference Section 01017, ELECTRICAL for technical requirements.

1.2.12 Toilet (Room 111)

1.2.12.1 Functional Description

This room has dual functions as a staff toilet and handicap accessible public toilet for parents and visitors. Room size and configuration shall meet ADA requirements for adult use.

1.2.12.2 Plumbing Fixtures

Plumbing fixtures shall consist of a wall mounted flush valve toilet and wall mounted porcelain sink. Mounting heights and clearances shall be ADA compliant for adult use. Reference Section 01016, MECHANICAL for technical requirements.

1.2.12.3 Toilet Accessories

All accessories shall be stainless steel and conform to the requirements of specification Section 10000, DIVISION 10: SPECCIALTIES (paragraph 1.8, SECTION 10800A TOILET ACCESSORIES). Accessories shall be of dimensions and mounted at heights in compliance with ADA requirements. One each of the following accessory types shall be provided:

- A. Wall mounted, recessed double-roll toilet tissue dispenser.
- B. Wall mounted, recessed sanitary napkin disposal unit.
- C. Door mounted coat hook.
- D. Wall mounted, surface mounted soap dispenser above the sink.
- E. Wall mounted, framed mirror above the sink.
- F. Wall mounted, semi-recessed paper towel dispenser and waste receptacle.
- G. Set of two wall mounted grab bars.

1.2.12.4 Light Fixtures

Lighting requirements for this room shall include a surface mounted fixture located in the center of the ceiling and a mirror light located horizontally above the mirror. Reference specification Section 01017, ELECTRICAL for technical requirements.

1.2.13 Staff Lounge (Room 112)

1.2.13.1 Functional Description

The staff lounge function shall provide a comfortable place for the staff to take breaks and/or eat lunch. Sufficient floor space shall be provided to support dining and lounge-type furniture, a counter and storage area which will support coffee-making, a full size refrigerator, and single tier wall lockers.

1.2.13.2 Cabinet Casework

Provide wall and base cabinets to dimensions as shown on the government drawings. Cabinets shall conform to the requirements of government edited specification Section 06410 LAMINATE-CLAD ARCHITECTURAL CASEWORK. Wall cabinets shall include an enclosed gypsum board ceiling soffit. Base cabinet shall be configured to include both drawer and door storage.

1.2.13.3 Cabinet Countertop

Countertop shall be to dimensions shown on the government floor plan, elevations and detail drawings and shall be composed of 13 mm thick solid surfacing material with a 25 mm bullnose solid surfacing material edge and coved 100 mm high backsplash. Solid surfacing material shall conform to the requirements of specification Section 06000, DIVISION 6: WOOD AND PLASTIC (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS). Countertop height shall be 900 mm above the finished floor. Countertop shall include the following plumbing fixtures:

A. Single compartment stainless steel sink shall include a detachable faucet with sprayer. See specification Section 01016, MECHANICAL for plumbing fixture requirements.

1.2.13.4 Countertop Wall Wainscot

Provide a 6 mm thick solid surfacing wainscot above the entire length of the coved backsplash as shown on the government drawings extending from the countertop backsplash to the underside of all wall cabinets. Score the surface to resemble wall tile. Solid surfacing material shall conform to the requirements of specification Section 06000, DIVISION 6 WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS).

1.2.13.5 Countertop Electrical/Lighting Requirements

Technical requirements and specifications shall conform to specification Section 01017, ELECTRICAL. Electrical and lighting requirements in support of the counter area shall include:

- A. Wall Outlets. Provide GFI wall outlets to support portable countertop appliances. Quantities and locations shall be as shown on the government drawings. Provide a wall outlet on the wall at the microwave oven shelf in the wall cabinets.
- B. Task Lighting. Provide task lighting mounted to the underside of the wall cabinets in quantities and locations shown on the government drawings.

1.2.13.6 Lockers

Staff lounge shall include a minimum quantity of 20 pre-fabricated, wood finished, full size lockers for staff use as located on the government drawings. Locker size shall be 305 mm wide by 457 mm deep by 1524 mm high. Lockers shall include a continuous enclosed base with wall construction, including a ceiling soffit, to provide a "built-in", enclosed appearance. Reference government edited specification Section 10500, LOCKERS, PARAGRAPH 2.2.

1.2.14 Training Room (Room 114)

The Training Room shall be designed for use by both parents and staff and shall be of adequate size to support two pre-wired workstations with computers, lockable storage cabinets, open shelving units, and a small lirary resource reading/conference table with chairs. All furnishings shall be N.I.C. Electrical requirements shall include all necessary in-wall conduit and cabling required to support the electrical, communications, and data requirements of the workstations.

1.2.15 Assistant Director's Office (Room 115)

The Assistant Director's office shall be designed for a single occupant and shall be of adequate size to support one pre-wired workstation with a guest chair. All furnishings shall be N.I.C. Electrical requirements shall include all necessary in-wall conduit and cabling required to support the electrical, communications, and data requirements of the workstation.

1.2.16 Director's Office (Room 116)

The Director's office shall be designed for a single occupant and shall be of adequate size to support one pre-wired workstation with two guest chairs for staffo ro parent counseling. All furnishings shall be N.I.C. Electrical requirements shall include all necessary in-wall conduit and cabling required to support the electrical, communications, and data requirements of the workstation.

1.2.17 Kitchen (Room 117)

1.2.17.1 Functional Description

The kitchen shall be considered "commercial grade" and the design and layout shall meet all equipment requirements for food cooking and preparation based on USDA and Army Preventative Regulations. Equipment and arrangement shall be sufficient to prepare and serve the full menu currently being provided for this age group as well as projected future needs. The recommended layout with minimum room and equipment sizes is provided in the government drawings. The floor slab shall slope to floor drain locations.

1.2.17.2 Equipment Requirements

Equipment, including countertop units, shall meet the requirements of specification Section 11000, EQUIPMENT. All equipment, countertop surfaces, and shelving shall be pre-fabricated and constructed of, or have a finish of, stainless steel. Built-in cabinetry or shelving shall not be permitted with the exception of the manager's desk.

1.2.17.3 Manager's Desk and Wall Cabinet

The kitchen shall include a built-in manager's desk and wall storage cabinet in a location as shown on the government drawings. Dimensions, construction, and finishes shall be as shown on the government drawings and as specified in specification Section 06000, DIVISION 6: WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS) and government edited specification Section 06410 LAMINATE-CLAD ARCHITECTURAL CASEWORK).

1.2.18 Scullery (Room 118)

1.2.18.1 Functional Description

The scullery shall contain ample floor space and utilities to support a commercial dishwasher, pot scrubbing sink, condensation vent hood, and storage space as shown and dimensioned on the government drawings. The floor slab shall slope to floor drain locations. The scullary shall include a pass-through window into the atrium for dirty dish return. The window shall include a lockable, stainless steel, roll down door.

1.2.18.2 Equipment Requirements

Equipment, including countertop units, shall meet the requirements of specification Section 11000, EQUIPMENT. All equipment, countertop surfaces, and shelving shall be pre-fabricated and constructed of, or have a finish of, stainless steel. Built-in cabinetry or shelving shall not be permitted.

1.2.19 Walk-In Freezer (Room 119)

1.2.19.1 Functional Description

A pre-fabricated, walk-in freezer unit shall be provided in the location and to dimensions as shown on the government drawings. A condensing unit located outside the building shall be provided to support the freezer. The freezer unit shall include shelving units in locations and to dimensions shown on the government drawings.

1.2.19.2 Equipment Requirements

The freezer unit, shelving, including ancillary equipment and the condenser unit shall meet the requirements of specification Section 11000, EQUIPMENT.

1.2.20 Walk-In Refrigerator (Room 120)

1.2.20.1 Functional Description

A pre-fabricated, walk-in refrigerator unit shall be provided in the location and to dimensions as shown on the government drawings. A condensing unit located outside the building shall be provided to support the freezer. The freezer unit shall include shelving units in locations and to dimensions shown on the government drawings.

1.2.20.2 Equipment Requirements

The refrigerator unit, shelving, including ancillary equipment and the condenser unit shall meet the requirements of specification Section 11000, EQUIPMENT.

1.2.21 Dry Food Storage (Room 121)

1.2.21.1 Functional Description

The dry food storage area shall contain stainless steel wire rack storage units with adjustable shelves to dimensions as shown on the government drawings and in accordance with specification Section 11000, EQUIPMENT.

1.2.22 Children's (Male/Female) Toilets (Rooms 122, 123, 133, 134, 140, and 141)

1.2.22.1 Functional Description

Children's restrooms shall be handicap accessible in accordance with

ADA/ADAAG requirements. Each toilet area and toilet stall shall include all typical accessories found in adult restrooms including sanitary dispoer units in the female restrooms. Mounting heights for plumbing fixtures and accessories are shown as an average height with regard to the range of ages using the toilets.

1.2.22.2 Flooring

Flooring shall be a poured or broadcast aggregated material. Flooring material and installation shall meet the requirements of government edited specification Section 09670, SEAMLESS RESINOUS FLOORING. Flooring shall include the use of more than one color to create patterns such as perimeters or other geometric patterns to lend interest and aethetic appeal to the floor area. The floor slab shall slope to floor drain locations.

1.2.22.3 Wall Surfaces

All walls shall utilize a moisture-resistant gypsum wallboard with ceramic tile finish, floor to ceiling. Ceramic tile shall include a neutral field color with a horizontal banding pattern utilizing a minimum of two subtle accent colors. Ceramic tile shall meet the requirements of specification Section 09910, CERAMIC TILE.

1.2.22.4 Plumbing Fixtures

Plumbing fixtures shall be in accordance with requirements provide in Section 01016, MECHANICAL, and shall include the following:

- A. Water Closets. All water closets shall be wall-mounted with a proposed toilet rim height of 380 mm. Provide added structural wall support to achieve maximum durability of the installation. Flush valves shall be equipped with infrared automatic on/off sensors
- B. Urinals. All urninals shall be wall-mounted with a proposed toilet rim height of 356 mm. Provide added structural wall support to achieve maximum durability of the installation. Flush valves shall be equipped with infrared automatic on/off sensors
- C. Lavatory Sinks. Sinks shall be individual, wall mounted units. Sinks shall have a proposed mounted sink rim height of 790 mm with 610 mm knee clearance for wheelchairs. One sink in each toilet shall have a proposed lower mounting height of 660 mm which does not require knee clearance but does require parallel wheelchair approach. Faucet sets shall be equipped with infrared automatic on/off sensors.

1.2.22.5 Toilet Partitions

Toilet partitions shall be solid phenolic construction with a floor mounted, overhead braced design in accordance with specification Section 10000 (paragraph 1.3, SECTION 10160A, TOILET PARTITIONS).

1.2.22.6 Toilet Accessories

Minimum requirements for toilet accessories shall be as indicated in specification Section 10000, DIVISION 10: SPECIALTIES (paragraph 1.8, SECTION 10800A, TOILET ACCESSORIES). All accessories shall be surface mounted unless otherwise noted.

A. Grab Bars. Grab bars shall be mounted at a height of 635 mm in

handicap accessible stalls.

- B. Toilet Tissue Dispenser. A toilet tissue dispenser shall be provided in all toilet stalls at a mounting height of $430~\mathrm{mm}$
- C. Paper Towel Dispenser/Waste Rectacle Unit. All toilet rooms shall be equipped with semi recessed, wall mounted combination paper towel dispenser and waste recetacle units with a minimum of one unit for every three sinks. Mounting height to dispenser opening shall be 1000 mm.
- D. Framed Mirrors. A continuous framed wall mirror shall be provided above the sinks extending from the outside edge to outside edge of the farthest most sinks, not including the sink installed at the 660mm height. The 660 mm high sink shall have an individual framed mirror at each location.

1.2.23 Janitor Closet (Room 124)

1.2.23.1 Functional Description

Janitor closet shall include a floor mounted corner mop sink with a 1200mm high ceramic tile wainscot on all the walls. Use moisture-resistant gypsum on all walls. Provide a wall mounted mop rack above the mop sink with a capacity for at least 3 mops. Provide a minimum of 3 adjustable, wall mounted shelves to support storage of cleaning materials and containers.

1.2.24 Storage Rooms (Rooms 126, 130, and 132)

1.2.24.1 Functional Description

All storage rooms shall contain storage shelving units with adjustable shelving as specified in specification Section 10000, DIVISION 10: SPECIALTIES (paragraph 1.7, SECTION 10670, METAL UTILITY SHELVING). Storage & Issue (Room 132) shall include a minimum 2400 mm high chain link fence to form an outdoor equipment storage cage. Fence location and length shall be as shown on the government drawings.

1.2.25 Laundry Room (Room 127)

1.2.25.1 Functional Description

The room shall be sized to accommodate a commercial clothes washer and dryer (N.I.C.), and built-in casework sink cabinet. All walls shall be composed of moisture-resistant gypsum wall board.

1.2.25.2 Flooring

Flooring shall be porcelain tile with a porcelain tile base meeting the requirements of government edited specification Section 09910A, CERAMIC TILE. The floor shall slope to a center floor drain.

1.2.25.3 Cabinet Casework

The base cabinet and wall cabinet above shall be in a location and to dimensions as shown on the government drawings, and shall include:

A. A single bowl, deep stainless steel sink with gooseneck faucet installed in the base cabinet.

- B. A minimum of one adjustable shelf in the wall and base cabinets.
- C. Countertop shall be constructed of 13 mm solid surfacing material with a 25 mm diameter solid surfacing bullnose edge. Solid surfacing material shall meet the requirements of specification Section 06000, DIVISION 6: WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS).
- D. Cabinet materials and construction shall meet the requirements of government edited specification Section 06410 LAMINATE-CLAD ARCHITECTURAL CASEWORK).

1.2.26 Multi-Purpose Room (Room 131)

1.2.26.1 Functional Description

The multi-purpose room will dual function as an area for skill building clinics, fitness activities, and team events or as two activity rooms when needed. The sports and fitness programming element of Army programs will be emphasized when this room is used as one large area. The multi-purpose room shall be large enough to aid in the development of large motor skills such as jump-rope, hopscotch, limbo, basketball, volleyball, sports clinics, and non-competitive physical activities. There will be no permanently floor or wall mounted basketball hoops, net stanchions, or other sport equipment supports. All sports equipment will be mobile.

1.2.26.2 Flooring

Floor finish shall be a resilient athletic flooring material. The flooring material shall be equal in construction and performance to Mondo "Advance" and the requirements provided in government edited specification Section 09620A. Material shall be a single solid color with no striping required.

1.2.26.3 Wall Finishes

Walls shall be painted, concrete block or reinforced gysum board with the following additions:

- A. Cushioned Wall Padding. Contractor shall supply and install cushioned wall padding. Padding shall be hung on all walls and shall appear continuous with minimal vertical gaps between the pads except where wall-mounted equipment or items are located. Pad location shall include covering the wall-mounted mirror. Mirror height shall be coordinated to allow for pad hanging devices to be placed at the the same height as all other wall areas. The cushioned wall padding shall meet the minimum specificications in accordance with specification Section 11000 (paragraph 1.4, SECTION 11480, ATHLETIC WALL PADS. Contractor shall supply suitable horizontal structural wall support for the manufacturer's hanging devices.
- B. Acoustical Wall Panels. Contractor shall supply and install fabric-wrapped acoustical wall panels to meet the minimum construction, performance, area size, mounting height, and installation requirements indicated in the government edited specification Section 09520, ACOUSTICAL WALL PANELS.

1.2.26.4 Curtain Divider

A fabric, floor-to-ceiling, drop-down divider shall be provided as located on the government drawings to divide the room in half. The entire unit and components shall be designed for gymnasium/multi-purpose institutional use. The fabric shall be composed of an opaque material for at least the first 2400 mm above the floor with a mesh netting or other comparable non-restricting airflow material comprising the remainder of the divider. The divider shall be raised and lowered with an electric motor controlled by a wall switch. The lowering device shall include applicable safety features which preclude accidental injury to children below during lowering procedure.

1.2.26.5 Ceiling Acoustical Banners

The open structural ceiling area shall include the use of a fabric-covered, acoustical banner product for maximum sound absorption in accordance with government edited specification Section 09520, ACOUSTICAL WALL PANELS. Contractor supplied and installed banners shall be flexible and draped throughout the ceiling and mechanically fastened to the structure.

1.2.26.6 Wall Mirror

One wall shall contain a continuous, segmented wall mirror and shall utilize a portable, freestanding set of balance bars as located on the government drawings. The bars shall be considered N.I.C. (not in contract) with respect to this Contract.

A. Mirror Requirements. Overall mirror dimensions shall be 5200 mm wide by 1800 mm high or, if less, the maximum height allowed below the wall padding hanging devices. Mirror shall be composed of shatterproof 6 mm thick laminated safety glass with the bottom edge 102 mm above the finished floor, or as required to coordinate with the height of the wall base. Mirror segments shall be sized to the greatest standard width available. Segments shall be butted together without the use of battens or molding strips. Overall perimeter mirror edges shall be finished.

1.2.27 Art and Science Activity Room (Room 135)

1.2.27.1 Functional Description

The primary function of this room is to support structured activities involving art, science, and hobbies. Electrical requirements shall include all necessary in-wall conduit and cabling required to support the electrical, communications, and data requirements for a single computer workstation.

1.2.27.2 Flooring

Flooring shall be vinyl composition tile with requirements in accordance with specification Section 09000, DIVISION 9: FINSIHES (paragraph 1.5, SECTION 09620A, RESILIENT FLOORING). Floor tile shall incorporate patterns utilizing a minimum of 3 colors. Patterns and colors should be sophisticated and subdued.

1.2.27.3 Wall Treatment

All exposed wall surfaces shall include a 900 mm high 0.762 mm thick, semi-rigid, Acrovyn vinyl wallcovering to include a low profile

vinyl/acrylic 100 mm high chair rail cap. Semi-rigid Acrovyn vinyl wallcovering shall conform to the requirements provided in specification Section 09000, DIVISION 9: FINISHES (paragraph 1.7, SECTION 09720A, WALLCOVERINGS).

1.2.27.4 Cabinet Casework

Provide wall and base cabinets to dimensions as shown on the government drawings. Cabinets shall conform to the requirements of government edited specification Section 06410 LAMINATE-CLAD ARCHITECTURAL CASEWORK. Wall cabinets shall include an enclosed gypsum board ceiling soffit. Base cabinet shall be configured to include both drawer and door storage.

1.2.27.5 Cabinet Countertop

Countertop shall be to dimensions shown on the government floor plan, elevations and detail drawings and shall be composed of 13mm thick solid surfacing material with a 25 mml-inch bullnose solid surfacing material edge and coved 100 mm high backsplash. Solid surfacing material shall conform to the requirements of specification Section 06000, DIVISION 6: WOOD AND PLASTIC (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS). Countertop height shall be 813 mm above the finished floor. Countertop shall include the following plumbing fixtures:

A. Double compartment deep stainless steel sink shall include a detachable faucet with sprayer. See Section 01016, MECHANICAL for plumbing fixture requirements.

1.2.27.6 Countertop Wall Wainscot

Provide a 6 mm thick solid surfacing wainscot above the entire length of the coved backsplash as shown on the government drawings extending from the countertop backsplash to the underside of all wall cabinets. Score the surface to resemble wall tile. Solid surfacing material shall conform to the requirements of specification Section 06000, DIVISION 6 WOOD AND PLASTICS (paragraph 1.4 SECTION 06650, SOLID POLYMER FABRICATIONS).

1.2.27.7 Countertop Electrical/Lighting Requirements

Technical requirements and specifications shall conform to Section 01017, ELECTRICAL. Electrical and lighting requirements in support of the counter area shall include:

- A. Wall Outlets. Provide GFI wall outlets to support portable equipment. Quantities and locations shall be as shown on the government drawings.
- B. Task Lighting. Provide task lighting mounted to the underside of the wall cabinets in quantities and locations shown on the government drawings.

1.2.28 Performing Arts Activity Room (Room 136)

1.2.28.1 Functional Description

The primary function of this room is to support structured activities involving the performing arts such as drama, dance, ballet, and music. Electrical requirements shall include all necessary in-wall conduit and cabling required to support the electrical, communications, and data

requirements for a single computer workstation.

1.2.28.2 Flooring

Flooring shall be vinyl composition tile with requirements in accordance with specification Section 09000, DIVISION 9: FINSIHES (paragraph 1.5, SECTION 09650A, RESILIENT FLOORING). Floor tile shall incorporate patterns utilizing a minimum of 3 colors. Patterns and colors shall be sophisticated and subdued.

1.2.28.3 Wall Treatment

All exposed wall surfaces shall include a 900 mm high 0.762 mm thick, semi-rigid, Acrovyn vinyl wallcovering to include a low profile vinyl/acrylic 100 mm high chair rail cap. Semi-rigid Acrovyn vinyl wallcovering shall conform to the requirements provided in specification Section 09000, DIVISION 9: FINISHES (paragraph 1.7, SECTION 09720A, WALLCOVERINGS).

1.2.28.4 Mirror and Balance Bars

One wall shall contain a continuous, segmented wall mirror and wall-mounted wood balance (ballet) bars as located on the government drawings.

- A. Mirror Requirements. Overall mirror dimensions shall be 5200 mm wide by 1800 mm high. Mirror shall be composed of shatterproof 6 mm thick laminated safety glass with the bottom edge 102 mm above the finished floor, or as required to coordinate with the height of the wall base. Mirror segments shall be sized to the greatest standard width available. Segments shall be butted together without the use of battens or molding strips. Overall perimeter mirror edges shall be finished.
- B. Bar Requirements. Bars shall be parallel to the floor and of equal length to the mirror. One bar shall be mounted 838 mm and the other 1143 mm above the finished floor. Both bars shall be constructed of 50mm diameter solid oak, stained to match the wood doors with a polyurethane finish. Bars shall be provided with adequate structural wall support and wall-mounted brackets to sustain a 136 K point load. Bars shall be centered 75 mm from the mirror surface. Support brackets shall be attached through the mirror.

1.2.29 Activity Rooms (Room 137, 138, and 139)

1.2.29.1 Functional Description

The primary function of this room is to support structured activities involving hobbies, skill building classes, club meetings, etc. Electrical requirements shall include all necessary in-wall conduit and cabling required to support the electrical, communications, and data requirements for a single computer workstation.

1.2.29.2 Flooring

Flooring shall be vinyl composition tile with requirements in accordance with specification Section 09000, DIVISION 9: FINSIHES (paragraph 1.5, SECTION 09650A, RESILIENT FLOORING). Floor tile shall incorporate patterns utilizing a minimum of 3 colors. Patterns and colors shall be sophisticated and subdued.

1.2.29.3 Mirror and Balance Bars (Room 138 Only)

One wall shall contain a continuous, segmented wall mirror and wall-mounted wood balance (ballet) bars as located on the government drawings.

- A. Mirror Requirements. Overall mirror dimensions shall be 5200 mm wide by 1800 mm high. Mirror shall be composed of shatterproof 6 mm thick laminated safety glass with the bottom edge 102 mm above the finished floor, or as required to coordinate with the height of the wall base. Mirror segments shall be sized to the greatest standard width available. Segments shall be butted together without the use of battens or molding strips. Overall perimeter mirror edges shall be finished.
- B. Bar Requirements. Bars shall be parallel to the floor and of equal length to the mirror. One bar shall be mounted 838 mm and the other 1143 mm above the finished floor. Both bars shall be constructed of 50mm diameter solid oak, stained to match the wood doors with a polyurethane finish. Bars shall be provided with adequate structural wall support and wall-mounted brackets to sustain a 136 K point load. Bars shall be centered 75 mm from the mirror surface. Support brackets shall be attached through the mirror.

1.2.30 Homework Center (Room 143)

1.2.30.1 Functional Description

This room shall support the Mentoring, Intervention, and Education Services component of Army programming. This area shall provide a flexible environment conducive to learning that does not replicate a rigid "classroom like" atmosphere. The room should contain areas for tutoring, mentoring, and a quiet area for reading. Additional insulation and other construction materials and methods, to include appropriate finish materials, shall be utilized to provide an exceptionally sound insulated room where the transmission of noise and activity from surrounding rooms and the atrium are minimized. This room should accommodate a minimum of 4 computer workstations including printers and other ancillary computer peripherals.

1.2.30.2 Wall Treatment

All exposed wall surfaces shall include a 900 mm high 0.762 mm thick, semi-rigid, Acrovyn vinyl wallcovering to include a low profile vinyl/acrylic 100 mm high chair rail cap. Semi-rigid Acrovyn vinyl wallcovering shall conform to the requirements provided in specification Section 09000, DIVISION 9: FINISHES (paragraph 1.7, SECTION 09720A, WALLCOVERINGS).

1.2.31 Computer Lab (Room 144)

1.2.31.1 Functional Description

This room will support the use of educational opportunities afforded by computers. Activities may include, but are not limited to, mentoring and sharing ideas, a reading area, listening to tapes, surfing the internet, learning to use computers and the internet, etc. This room should accommodate a minimum of 15 computer workstations including printers and other ancillary computer peripherals.

1.2.31.2 Wall Treatment

All exposed wall surfaces shall include a 900 mm high 0.762 mm thick, semi-rigid, Acrovyn vinyl wallcovering to include a low profile vinyl/acrylic 100 mm high chair rail cap. Semi-rigid Acrovyn vinyl wallcovering shall conform to the requirements provided in specification Section 09000, DIVISION 9: FINISHES (paragraph 1.7, SECTION 09720A, WALLCOVERINGS).

-- End of Section --

SECTION 01015

STRUCTURAL REQUIREMENTS

PART 1 STRUCTURAL

1.1 CODES AND REFERENCE PUBLICATIONS

US ARMY CORPS OF ENGINEERS, KANSAS CITY DISTRICT

SDCC Kansas City District Structural Design

Controlling Criteria

FEDERAL EMERGENCY MANAGEMENT AGENCY

FEMA 361 Design and Construction Guidance for

Community Shelters. (July 2000)

FEMA 302 NEHRP Recommended Provisions for Seismic

Regulations for New Buildings and Other

Structures

U.S. ARMY CORPS OF ENGINEERS TECHNICAL INSTRUCTIONS

TI 809-02 Structural Design Criteria for Buildings

(Sep 1999)

TI 809-04 Seismic Design For Buildings (Jan 1999)

TI 809-07 Design of Cold-Formed Load Bearing Steel

Systems and Masonry Veneer/Steel Stud

Walls (Nov 1998)

AMERICAN CONCRETE INSTITUTE BUILDING CODE

ACI 318-99 Requirements for Structural Concrete and

Commentary (ACI 318R-99)

AMERICAN INSTITUTE OF STEEL CONSTRUCTION

AISC "Manual of Steel Construction -Load &

Resistance Factor Design" (Latest Edition)

STEEL DECK INSTITUTE

SDI Steel Roof Deck Design Manual (Steel Deck

Institute Publication, current edition)

STEEL JOIST INSTITUTE

SJI Standard Specification, Load Tables and

Weight Tables

AMERICAN SOCIETY OF CIVIL ENGINEERS STANDARD

ASCE 7-98 ASCE Standard, Minimum Design Loads for

Buildings and Other Structures

U.S. Army Technical Manuals/Air Force Manuals

TM 5-809-3/AFM 88-3, Ch.3 Masonry Structural Design for Buildings (Oct 1992)

1.2 PROJECT DESCRIPTION AND REQUIREMENTS

The Child Development Center shall be a single story structure with floor, roof and exterior wall configurations as indicated on the attached architectural drawings. The building shall be structurally designed and configured by the Design/Build Contractor in accordance with the criteria and other requirements stated herein. The areas designated as "Tornado Shelters" in the Architectural drawings shall be designed and constructed in accordance with FEMA 361. The tornado shelter shall be structurally independent of the main structure and designed and constructed to withstand the high winds and the impact of windborne debris(missiles) during tornadoes. All structural calculations and drawings shall be checked and initialed as such by a registered engineer other than the original design engineer. Construction Documents (drawings and specifications) shall be sealed and signed by a Professional Registered engineer and licensed to perform work in the jurisdiction.

1.3 DESIGN CRITERIA

The structural design shall fully comply with the provisions provided in Section 01290 "Kansas City District Structural Design Controlling Criteria (SDCC)" and with additional requirements and revisions contained herein. In case of conflict between this document (section 01015) and SDCC, section 01015 controls.

1.4 STRUCTURAL LOADING CRITERIA

Structural loading criteria shall be developed using the criteria sources and following the procedures indicated below. The Child Development Center shall be classified as a Category III facility for the purpose of calculating of live, wind and snow loads.

1.4.1 Roof Live Loads

1.4.1.1 Snow Load

Roof snow load, including additional loading due to snow drifting where appropriate, shall be calculated and applied in accordance with ASCE 7-98 using a ground snow load of 960 Pa (20 PSF).

1.4.1.2 Rain on snow Loads

Rain loads shall be considered in accordance with ASCE 7-98.

1.4.1.3 Minimum Roof Live Load

Main Structure: A minimum roof live load of 960 Pa (20 PSF) applied in accordance with ASCE 7-98 shall be used as a loading condition for the roof independent of the calculated snow load.

Tornado Shelter: Tornado shelter roof shall be designed to support the collapse of the main structure roof and any micellaneous items (Mechanical

equipment) from above. In addition the weight of any walls adjacent to the shelter and projecting above the shelter roof shall also be considered collapsing on top of the tornado shelter roof. A loading of full dead load of the roof, walls and the miscellaneous items should be used. A dynamic increase factor of 1.5 shall be used to account for the gravitational acceleration of falling debris. Minimum roof live load shall not be less than 1920 pa (40 psf).

1.4.2 Floor Live Loads

Minimum uniformly distributed floor live loads shall be as listed below:

AREA	LIVE LOAD (Pa)		
Mechanical/Electrical Rooms	7200 (150 PSF)		
Kitchen	7200 (150 PSF)		
Walkin freezer	7200 (150 PSF)		
Child activity Rooms	7200 (100 PSF)		
Public Areas and Corridors Serving Public Areas	4800 (100 PSF)		
Light storage areas	6000 (125 PSF)		
All Other Areas	4800 (100 PSF)		

The floors shall be capable of supporting an $8.9~\mathrm{kN}$ (2000 LBS) concentrated load applied over a $760~\mathrm{mm}$ by $760~\mathrm{mm}$ area positioned anywhere.

1.4.3 Wind Loads

<u>Main Structure:</u> Wind loads shall be calculated in accordance with the procedures outlined in ASCE 7-98 using Exposure "C" and a Basic Wind Speed (3-Second Gust Speed) of 40 meters per second (90 mph). Wind loads for both the main wind-force resisting system and for components and cladding shall be considered.

<u>Tornado Shelter</u>: Wind loads shall be calculated in accordance with the procedures outlined in ASCE 7-98 using Exposure "C" and a Basic Wind Speed (3-Second Gust Speed) of 112 meters per second (250 mph). Method 2 - Analytical Procedure outlined in ASCE 7-98 shall be used to calculate the wind forces with the following parameters;

- a. Importance Factor I = 1.15
- b. Directionality Factor Kd = 1.0
- c. Internal Pressure Coefficient GCpi = + / 0.55

1.4.4 Seismic Loads

The Child Development Center shall be designed to withstand seismic loading in accordance with US Army Corps of Engineers TI 809-04. Seismic Parameters for Ft.Riley are as follows:

 $\rm S_S$ (Short Period Spectral Response Acceleration) = 0.2 $\rm S_1$ (1 Second Period Spectral Response Acceleration) = 0.06 Site Classification D. Seismic Use Group II.

1.4.5 Dead Loads

Minimum design dead loads for common building materials shall be obtained from ASCE 7-98. Equipment loads and loads for materials not listed in that publication can be obtained from other recognized sources. The calculated roof uniform dead loads include the weight of the roof system , mechanical, Sprinkler system, electrical and architectural items. In addition to the

calculated uniform roof dead loads, roof design must also includes contrated loads from mechanical equipments and other misellaneous items. The calculated total uniform loads for mechanical, electrical and sprinkler system shall not be less than 10 psf. When calculating netuplift loads using ASCE 7-98 load combinations, use 50% of the total uniform loads of mechanical, electrical and sprinkler loads.

1.4.6 Lateral Partition Loads

The minimum design wind pressure on interior partitions shall be 240 Pa (5 psf) normal to the partition.

1.4.7 Deflections

1.4.7.1 Roofs

Deflections of structural members shall not be greater than allowed by the applicable material standard (ACI, AISC, etc.) and the limits set forth below. Deflection limits are needed to restrict damage to ceilings, partitions, other fragile nonstructural elements. Member deflection shall not exceed that permitted by TI-809-02 and TI 809-04. The deflection of structural members supporting roofs, due to dead load plus either live load, snow load, or wind load, shall not exceed 1/240 of the span; and due to only live load, snow load, or wind load, shall not exceed 1/360 of the span.

The above deflection criteria shall not apply to tornado shelter when ASCE 7-98 load combintions include wind loads.

1.4.7.2 Structural concrete Masonry walls, Non-load bearing concrete masonry partitions and Brick veneer;

The lateral deflection due to loads shall not exceed 1/600 of the span. The vertical deflection due to loads shall not exceed 1/600 of the span.

1.5 STRUCTURAL MATERIALS

Materials for structural elements shall be as indicated herein or on the attached architectural drawings. Where materials are not indicated, selection shall be at the Design/Build Contractor's discretion.

1.5.1 Structural Steel

1.5.1.1 Design

Structural steel shall be designed in accordance with AISC Specification for Structural Steel Buildings - LRFD. All structural steel members shall be designed by the structural engineer to support all applicable loads. Structural drawings shall clearly show all structural members, connections and their locations.

1.5.1.2 Connections

Types of connections shall be consistent with the design assumptions for the basic type of steel construction used. Connection design shall be the responsibility of the structural engineer for the Design/Build Contractor and shall not be delegated to the steel fabricator.

1.5.2 Steel Joists and Joist Girders

The design and selection of steel joists and joist girders shall be governed by the Steel Joist Institute (SJI) Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders. The net wind uplift requirements shall be clearly delineated on the drawings. Joists requiring special configurations or design to resist wind uplift and non-uniform loads shall be designated as such on the drawings and the required design loads indicated, per SJI recommendations. Joist end supports and anchorage to resist uplift shall be designed to accommodate the applied forces, including those resulting from wind and seismic activity.

1.5.3 Steel Decking

The design and selection of steel deck shall be in accordance with the provisions of the Steel Deck Institute (SDI) Design Manual. Minimum required section properties of deck sections shall be determined as prescribed by the appropriate Specifications of the SDI Design Manual, and shall be specified or indicated on the drawings. Where the steel deck is designed to function as a shear diaphragm, the design shall be in accordance with the provisions of the Steel Deck Institute (SDI) Diaphragm Design Manual and Army Corps of Engineers TI 809-04.

1.5.4 Masonry

1.5.4.1 Design

Masonry design shall be in accordance with US Army Corps of Engineers TM 5-809-3, TI 809-04 and FEMA 302. Reinforcement shall be sufficient to satisfy the calculated requirements for strength, shrinkage crack control, and seismic design. In no case shall reinforcement be less than the minimum seismic reinforcement required by TI 809-04 and FEMA 302. If masonry walls are used in conjunction with steel framing as non-load-bearing and non-shear-resisting elements, the connections between walls and the structural steel frames must be designed to allow vertical and horizontal frame deflection without transferring loads from steel to adjoining masonry walls. Use "Release 2.0 of the CADD details library by CADD/GIS Technology Center" for masonry details. Masonry details can be obtained from the following web address: http://tsc.wes.army.mil/products/cadd_details/

1.5.4.2 Crack Control

Concrete masonry crack control measures comprised of masonry control joints, joint reinforcement, and bond beams shall be incorporated in the design of concrete masonry walls and partitions. Masonry Control Joints (MCJ) shall be judiciously located at spacings no greater than the maximums recommended in TM 5-809-3 and TI 809-04 and shall be shown on the Architectural elevations. Control joints shall not be placed closer than 600mm to openings.

1.5.5 Reinforced Concrete

1.5.5.1 Design

Reinforced concrete design shall be in accordance with ACI 318 and related current ACI publications which are applicable to the design, TI 809-02, and Army Corps of Engineers TI 809-04, as applicable. All concrete elements, including slabs-on-grade, shall be reinforced with temperature and shrinkage reinforcement as a minimum. Temperature reinforcement shall be

as recommended by ACI and TI 809-02, as appropriate.

1.5.5.2 Reinforcing Bar Usage Limitations

Grade $420\,$ bars shall be used for concrete design. Minimum bar size shall be $\#13M\,$ bars except for stirrups and ties which may be $\#10M\,$ bars as per ACI.

1.5.5.3 Concrete Joints

Control joints and contraction joints shall be located to reduce concrete cracking to a minimum. All exposed concrete joints shall be sealed with appropriate joint sealants.

1.6 STRUCTURAL FRAMING SYSTEMS

1.6.1 General

1.6.1.1 Main Structure

The structural systems used for the Child Development Center shall be selected and designed by the Contractor. The Basic Seismic-Force-Resisting System shall conform to one of the types indicated in Table 7-1 of TI 809-04 and Table 5.2.2 of FEMA 302 subject to the limitations on height based on the Seismic Design Category indicated in the table. In case of conflict between Table 7-1 of TI809-04 and Table 5.2.2 of FEMA 302, values from Table 5.2.2 of FEMA 302 governs. The lateral load resisting system shall incorporate bracing, moment resisting frames, shear walls, diaphragms, or any combination thereof, provided the elements of the system are compatible with the attached architectural floor plan. Cold-formed light-gage metal framing (i.e., steel studs) systems shall be designed in accordance with TI 809-07. Wood framing construction will not be permitted.

1.6.1.2 Tornado Shelter

The areas designated as "Tornado Shelters" in the Architectural drawings shall be designed and constructed in accordance with FEMA 361. The tornado shelter shall be structurally independent of the main structure and shall be be designed and constructed to withstand the high winds and the impact of windborne debris(missiles) during tornadoes. Following are the minimum requirements for construction of the Tornado Shelter:

- a. Reinforced concrete (roof and wall sections at least 8 inches thick) with at least #13M (#4) reinforcing steel at 10 inches on center (o.c.) both horizontally and vertically.
- b. Concrete masonry units 8-inch to 12-inch (walls) with at least #13M(#4) vertical reinforcing steel, fully grouted in each cell, and horizontal joint reinforcement as required by design. Roof of the Tornado shelter shall be minimum 8" thick reinforced concrete slab with minimum #13M(#4) reinforcing steel spaced at 10" oc in both direction.

1.6.1.3 Exterior covered Walkway (Price option)

Courtyard canopy between the main structure and the Youth activity center shall be structurally isolated from both the main structure and the Youth activity center. Main entrance canopy shall be structurally isolated from the main structure.

1.7 Roof Framing

The roof buildings shall slope as required for the type of roofing system used. The roof slope shall be accomplished by sloping of the structural framing members. The design of roof framing members shall include consideration of any concentrated loads from suspended mechanical and electrical equipment, including cable trays and HVAC units. The location and magnitude of suspended equipment loads shall be closely coordinated with the mechanical and electrical system designs.

1.8 Location of Structural Elements

Structural elements, including columns, bracing, shear walls and load-bearing walls shall be located as required by the structural design. The structural design and corresponding selection and location of structural elements shall be compatible with the floor plan, roof plan, elevations and other architectural drawings included in the attachments to this document. Columns shall be located in walls, and in such a manner that doorways or other accessways are not obstructed. Pilasters and in-wall columns which protrude into the room spaces are not allowed. Use of structural bracing shall be minimized, and shall be limited to locations where bracing is concealable at interior or exterior wall lines and does not obstruct windows, doors or other openings. Shear walls, where used, shall be located in coordination with architectural partition requirements.

1.9 Interior/Exterior Walls

1.9.1 Non-load bearing walls

Non-load-bearing walls shall be shall be laterally braced by the roof structure, and shall be connected in a manner which provides for vertical deflection of the roof structure without inducing vertical loads into the wall.

1.9.2 Shear Walls

Shear walls, where used, shall be constructed of cast-in-place reinforced concrete, reinforced concrete masonry units, or cold formed steel panels with diagonal steel straps at the Design/Build Contractor's choice. Shear walls shall be designed in accordance with ACI 318, TM 5-809-3, TI 809-07, FEMA 302 and Army Corps of Engineers TI 809-04.

1.10 FOUNDATION SYSTEMS

Foundation system shall be designed in accordance with Secton 01290 "Kansas City District Structural Controlling Criteria" and The Subsurface Investigation Report (section 01011). The components of the foundation system shall be constructed of reinforced concrete. The required 28-day compressive strength of concrete for the foundations shall be 27.6 MPa(4000 psi) minimum. All parts of the foundation system shall be designed to keep dead load footing pressures relatively uniform, in order to minimize differential settlements. The slabs-on-grade shall be reinforced slabs having a minimum thickness of 100mm with the actual thickness and design based on actual design loads. All slabs-on grade shall be underlain by a 6 mil vapor barrier over 150mm capillary water barrier. For addition requirements refer to section 01011.

1.10.1 Design Parameters

Parameters used for foundation design, including the allowable soil bearing pressure, lateral earth pressure coefficients and design footing depths shall be in accordance with the Final Foundation Analysis report provided in Section 01011. The allowable soil bearing pressure represents the allowable soil stress at the base of footings in excess of that due to existing overburden. The weight of any fill added to the site above that required for frost protection shall be subtracted from the allowable soil bearing pressure to arrive at a net allowable pressure due to structural loads.

1.10.2 Foundation Perimeter Insulation

Perimeter insulation shall be installed on the interior face of all exterior perimeter foundation walls. Insulation shall extend from the bottom of the floor slab down to top of footing or down to design frost depth.

1.10.3 Structural Stoops at Exterior Doorways

All exterior pedestrian doorways require structural stoops. Stoops shall have foundation walls extending down to frost depth and shall be rigidly attached to building foundation walls. Stoops shall have a 300mm layer of uncompacted fill placed directly beneath the stoop slab. The stoop slab shall be flush with the interior floor slab at the threshold and shall slope away from the building at 2% minimum slope.

1.11 CONCRETE FLOOR SLABS-ON-GRADE

Design of slabs shall be in accordance with TI 809-02 and the following detailed instructions:

1.11.1 General

Slabs shall be designed as "floating slabs" without rigid edge support, and with lateral and vertical movement unrestrained. An isolation joint, consisting of a 13mm layer of expansion joint material, is required where slabs abut vertical surfaces. Slab thicknesses shall be selected in accordance with TI 809-02 or as required by design. Slabs shall be reinforced with a minimum of 0.18 percent steel based on cross sectional area. Crack control measures shall be incorporated in the slab design. Control joint details and spacings shall be as delineated in TI 809-02.

1.11.2 Interior Concrete Slabs-on-Grade

Interior slabs-on-grade shall be minimum 100mm thick placed over a 6 mil vapor barrier on top of a layer of crushed stone material with not less than 150mm compacted thickness. For additional requirements below slab-on-grade, refer to Section 01011. Where floor drains occur, the slab shall be sloped to drain. Maintain minimum slab thickness in the sloped area of the slab. All slab crack control joints, construction joints, isolation joints between edges of slabs and vertical surfaces, and any mechanical, plumbing or electrical penetrations through the floor slab shall be sealed with a flowable polyurethane caulk.

1.11.3 Interior Equipment Pads

Floor mounted mechanical and electrical equipment shall be installed on 150mm thick raised concrete housekeeping pads. The pads shall be

reinforced with at least the minimum temperature reinforcement required. The pads shall be sized 100mm larger all around than the piece of equipment furnished and all edges of the pad shall be chamfered. The equipment pad shall be anchored to the slab-on-grade with minimum #13M (#4) spaced at 12" oc along the perimeter of the concrete pad.

1.11.4 Equipment Vibration Isolation

All vibration producing mechanical and electrical equipment shall be mounted in such a manner as to prevent the transfer of vibrations to adjacent parts or areas of the building. If necessary for any large vibration producing equipment installed within the facility, the equipment will be supported on individual isolated foundations. The isolated foundation shall be separated from the building slab by a continuous 19mm expansion joint.

1.12 OTHER STRUCTURAL WORK

1.12.1 Standing Seam Roof Metal System

Standing seam metal roof shall comply with the requirements set forth in Technical Specification 07416 STRUCTURAL STANDING SEAM METAL ROOF (SSMR) SYSTEM and in SDCC. Final drawings will provide a list of loading criteria including roof live and wind uplift loads. A wind uplift diagram shall be used to identify wind uplift pressures and their locations on the roof. The component and cladding wind pressures for SSSMR shall be calculated based on 1 SQ.Meter tributory area.

1.12.2 Exterior Equipment Pads

Any exterior mechanical or electrical equipment shall be installed on concrete pads. The pads shall be a minimum of 200mm thick and shall be reinforced with at least the minimum temperature reinforcement required. The pads shall be sized 150mm larger all around than the piece of equipment furnished and all edges of the pad shall be chamfered. Design of exterior pads shall be coordinated with Mechanical and Electrical system designs.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION 01016

MECHANICAL REQUIREMENTS

PART 1 TECHNICAL REQUIREMENTS

This Section contains instructions and engineering requirements relating to the design of the new mechanical systems (both Plumbing and HVAC). design of all systems shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks, Terminology of HVAC&R guide and to the requirements of NFPA Standards Nos. 90A. The design and construction shall provide new mechanical systems, complete and ready for operation for the Child Development Center - School Age. Delineation of the mechanical work between the building and the site utilities construction shall generally, with the exception of the gas and chilled water system, be a point 1500 mm outside of the building. The design and installation of all mechanical systems, including manufacturer's products, shall meet the instructions and requirements contained herein and the requirements of the provided technical guide specifications. conflicts between these instructions and the guide specifications or criteria exist, these instructions shall take precedence. Any installation requirements within these instructions, but not contained in the specifications, shall be added to the specifications or shown on the drawings. The HVAC system type has been selected by the government on the basis of lowest Life Cycle Cost as required by Federal Law 10CFR436 to approach the Energy Use Budget (EUB) as required by Federal Law 10CFR435 of 450,000 kJ/sqm/year. Individual mechanical equipment selection by the designer shall also consider life cycle operability, maintenance and repair of the facility and real property installed equipment components and systems. The mechanical systems of the Child Development Center for School Age shall consist of gas distribution, plumbing, hydronic heating and cooling systems, unitary heating and cooling equipment for comunication rooms, air supply, distribution, ventilation, exhaust systems, and direct digital control systems with the following components as specificed below:

- a. Interior Gas Piping Systems.
- b. Thermal Insulation of Mechanical Systems.
- c. Plumbing Systems.
- d. Steam Systems (for Humidification only)
- e. Hydronic Heating Systems.
- f. Pulse boilers.
- g. Refrigeration/Chilled Water Systems.
- h. One Air Cooled, Rotary Screw liquid chiller.
- i. Air Cooled Fluid Cooler(s) located in conjunction with the Air Cooled, Rotary Screw liquid chiller.
- j. Hot and chilled water pumps.
- $k. \;$ Horizontal, ceiling hung, DX-type computer room or fan coil unit one per communication room.
- 1. One three-deck multi-zone air handler (the air handler is of the three-deck design, and equipped with a pre-cooling coil).
- m. One or more chemical free, dry steam humidifiers complete with an energy source.
- n. Blower Coil Unit (with a preheat coil and pre-cooling coil to provide pretreated outside air directly to spaces with high critical Z's as defined by ASHRAE standard 62).
- o. Exhaust fans

- p. Propeller Unit Heaters (Located in the mechanical rooms.
- q. Appropriate DDC controls for all systems.

All equipment installed shall be capable of maintaining the design conditions for all spaces throughout the life of the facility. Ease of access to components and systems in accordance with industry standards and safe working practices is a design requirement. All like equipment and accessories shall be from a single manufacturer.

1.1 MECHANICAL CRITERIA

The design shall comply with good engineering practice. Mechanical systems, including gas distribution, plumbing, HVAC systems and building temperature controls shall be designed to comply with this section and the documents listed below to the extent referenced in this section. The publications are referred to in the text by basic designation only. The latest edition of the following standards and codes in effect and amended as of date of supplier's proposal, and any subsections thereof as applicable, shall govern design and selection of equipment and material supplied:

Air Conditioning and Refrigeration Institute (ARI) Standard

American Conference of Governmental Industrial Hygienists (ACGIH) - Industrial Ventilation A Manual of Recommended Practice.

American Society for Testing and Materials (ASTM) publications - A53, D1248, F876, F877.

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):

Guides; Terminology of HVAC&R, 2nd Edition etc. Guideline 1, The HVAC Commissioning Process.

Handbooks; 1999 HVAC Applications, 2002 Refrigeration, 2001 Fundamentals, 2000 HVAC Systems & Equipment, etc. SI editions

Standards; 15-1994, 54-1992, 62-1999, 90.1-1989 & Addendum 90.1-1989, 52.1-1992, 111-88 etc..

American National Standards Institute (ANSI) publications - Z83.6.

American Society of Mechanical Engineers (ASME), 22 Law Drive, P.O. box 2900, Fairfield, N.J. 07007-2900.

Army Technical Instructions, TI 800-01, Design Criteria, dated Jul 1998.

Army Technical Instructions, TI 809-04, Seismic Design for Buildings, dated Dec 1998.

Army Technical Instructions, TI 810-10, Mechanical Design, Heating Ventilating and Air Conditioning, dated Feb 1999.

Army Technical Instructions, TI 810-11, Heating, Ventilating and Air Conditioning Control Systems, dated Nov 1998.

Army Technical Instructions, TI 810-32, Heating and Cooling Distribution Systems, dated Jan 2002.

Army Technical Manual, TM 5-802-1, Economic Studies for Military Construction, dated May 1995.

Army Technical Manual, TM 5-805-4, Noise Control for Mechanical Equipment, dated May 1995.

Army Technical Manual, TM 5-810-5, Plumbing, dated Aug 1993.

Energy Policy Act of 1992 (Public Law 102-486).

Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, dated March 8, 1994.

Executive Order 13123, Greening the Government Through Efficient Energy Management dated 3 June 1999.

Federal Register/Volume. 46, No. 222.

Instrument Society of America Standard (ISA S75.01), Current edition.

Manufacturers Standardization Society of the Valve and Fitting Industry, Inc. (MSS) Standards

MIL HDBK. 1008C, Fire Protection for Facilities

National Fire Codes (NFPA), with most current updates.

International Plumbing Code (IPC).

Safe Drinking Water Act of 1998.

Sheet Metal and air-conditioning Contractors National Association (SMACNA) Standards

Title 10 CFR, Part 435, Subpart A, pages 4535-4720 inclusive, Energy Conservation Voluntary Performance Standards for New Commercial and Multi-family High Rise Residential Buildings, Mandatory For New Federal Buildings Published January 30, 1989.

Underwriters Laboratories (UL 142), (UL 441) Current edition.

Uniform Building Code, latest edition

Military Criteria is available on the internet at www.usace.army.mil/inet/usace-docs/ and/or www.hnd.usace.army.mil/techinfo/instruct.htm.

1.2 General Mechanical Requirements

As applicable, the following shall be provided for all new mechanical systems:

1.2.1 Design Submittals

Drawings, specifications, design analysis and calculations shall be provided in accordance with SECTION 01019 - DESIGN AFTER AWARD-35 PERCENT, SECTION 01020 - DESIGN AFTER AWARD-60 PERCENT and SECTION 01021 - DESIGN AFTER AWARD-100 PERCENT.

1.2.2 Technical Specifications

For minimum technical specification requirements see SECTION 15000 - MECHANICAL SYSTEMS - OUTLINE SPECIFICATIONS.

1.2.3 Equipment Efficiency

Mechanical equipment shall be energy efficient per Executive Order 12902, 13123 and ASHRAE/90.1. Where products are not yet rated as energy efficient products by ENERGY STAR (Registered Trademark) the Contractor should strive to provide products that meet the above criteria and be in the upper 25 percent of energy efficiency as designated by FEMP.

1.2.4 Mechanical/Electrical Equipment Coordination

Arrangement of all mechanical equipment and piping shall be coordinated with electrical work to prevent interference with electrical componets. Special care shall be taken with conduits and other componets that may run through the mechanical room and to insure adequate space in shared chases. Mechanical equipment (pipes, ducts, etc. unless items solely serve the area) shall not be installed OVER OR WITHIN SPACE which is dedicated to transformers, panelboards, or other electrical equipment unless items solely serve the area. When electrical equipment is located in a mechanical equipment room, the dedicated electrical space shall be indicated by a dashed line and noted "Electrical Equipment Space".

1.2.5 Finished Spaces.

All piping and equipment located in finished areas of the building shall be concealed or furred-in; exposed piping and equipment is only allowed in utility, equipment, storage and other rooms of this nature.

1.2.6 Mechanical Spaces.

There is some flexibility in the size of some of the mechanical spaces. All mechanical rooms and yards shall have sufficient size as required to house all mechanical equipment and provide adequate clearance as specified below. All clearances required by the equipment manufacture for operation, routine maintenance, and replacement of minor and major components shall be provided for all mechanical equipment. Piping and supports shall not interfere with equipment maintenance access or pull space. In addition a minimum of 600 mm clear shall be provided around all mechanical equipment. Ample space shall be provided around equipment to allow unobstructed access for entry, servicing, and routine maintenance to include pull space for service and/or replacement of filters, coils, motors, boilers and other equipment items. Pull space provided in rooms for service and/or replacement of mechanical equipment items shall be indicated with broken (dashed) lines on the drawings. Provisions for installation, removal, and future replacement of equipment shall be coordinated with the architectural design. The arrangement, selection, and sizing of all mechanical equipment shall be such that it can be broken down and removed from the building without dismantling any adjacent systems or structures. All required clearances shall be provided for government acceptance to verify mechanical space layout. Servicing and maintenance areas interior and exterior to building shall be sized according to manufacturer's recommendations for equipment.

1.2.6.1 Mechanical Room.

The mechanical room shall house the boilers, air handling units, domestic hot water heating system, all pumps, and miscellaneous equipment. The gas service, domestic service and fire service enterances shall also be located in the mechanical room. The mechanical equipment room layouts shall be provided with ample floor space to accommodate routine maintenance of equipment and have head-room to accommodate required equipment as specified above.

1.2.6.2 Mechanical Equipment Yard.

The mechanical equipment yard shall house the chiller and fluid cooler(s). The equipment yard shall be as specified in Section 01012, SITE WORK/CIVIL/UTILITIES. In addition, ample space shall be provided around all cooling equipment to allow adequate air flow for heat rejection with consideration to the type of screening provided. At a minimum, all clearances shall be per the manufacture's recomendations.

1.2.7 Roof Mounted Equipment

Except for plumbing vents, boiler vents, exhaust fans serving cooking equipment, and louvered intake penthouses, with motorized dampers at the exterior, no other mechanical equipment shall be located on the roof of the facility.

1.2.8 Safety, Noise and Security.

Equipment shall be selected to meet the following safety, noise, and security criteria:

1.2.8.1 Rotating Guards.

All mechanical equipment selected shall have proper guards for rotating parts.

1.2.8.2 Noise.

All equipment selected shall not produce objectionable noise or vibration in occupied areas. All air supply devices shall be selected to have a noise criteria rating of NC30 or less.

1.2.8.3 Vibration Isolation/Equipment Pads

Provide vibration isolation devices on all new floor mounted or suspended mechanical equipment. All new floor mounted mechanical equipment shall be provided with housekeeping pads. Housekeeping pads shall be as specified in Section 01015, Structural Requirements.

1.2.8.4 Mechanical Rooms.

All mechanical rooms shall be secured and shall have access by only authorized personnel.

1.2.8.5 Fire Rated Walls

Fire-rated of walls shall be as required in Section 01013 ARCHITECTURAL BUILDING REQUIREMENTS.

1.3 Facility Descriptions

The facility is a Child Development Center for School Age children six to ten years of age. The facility shall be utilized for before school care, after school care and summer programs on a full day, partial day, or drop-in basis. Its role is to offer a developmentally sound program which provides a safe and nurturing environment that promotes the physical, social, emotional, and cognitive development of young children in the six to ten year age group while responding to the needs of families in accordance with Child Development Center Design Guide.

1.3.1 Occupancies - 225 Children (Nominal Capacity).

The facility shall be occupied 12 hours per day, 5 days per week. However, occupancy of the facility by children during the school year shall be limited before and after school care. It shall be assumed that some staff will be present 12 hours per day year round. Mechanical rooms, vestibules, janitor's closets, and storage shall be assumed as unoccupied. The specific room by room occupancies for the mechanical design of the Child Development Center for School Age shall be in accordance with Section 01013 ARCHITECTURAL. Occupant Diversity Factors shall not be allowed in any child activity areas, including Homework Center, Computer Lab, and Artiums.

1.3.2 Design Conditions.

1.3.2.1 Outdoor Design Temperatures.

Outdoor design conditions at Ft. Riley, Ks, in degrees C, shall be as follows:

Summer	Design Dry Bulb	35
Summer	Design Wet Bulb	24
Winter	Cooling Design Dry Bulb	5
Winter	Cooling Design Wet Bulb	5
Winter	Heating Design Dry Bulb	-16

1.3.2.2 Indoor Design Temperatures.

Mechanical designs shall give maximum consideration to the comfort of the occupants. The HVAC systems shall, at all times, maintain all occupied spaces, except for the restrooms, laundry and utilty spaces, within the ASHRAE comfort zone as defined in Standard 55-1992, Thermal Environmental Conditions for Human Occupancy. The restrooms and laundry shall be maintained with in this same comfort zone when exterior temperatures and humidities are below the comfort zone. Actual indoor design conditions and setpoints, in degrees C, shall be as follows:

Occupied Areas	Heat/Cool	20/26, 5	0%RH
Storage/Rest rooms	Heat/(Vent)	20/29	
Mechanical/utility	Heat/(Vent)	13/29	
unoccupied/Setback	Heat only	13	

1.3.2.3 Heating

All areas of the buildings shall be heated. Vestibules, etc, shall be heated for freeze protection of sprinklers only (or Mechanical design shall be coordinated with the Fire Sprinkler Installation for freeze protection).

1.3.2.4 Cooling

All areas of the buildings shall be provided with mechanical cooling (via refrigeration) except for the laundry, restrooms, vestibules, storage areas, mechanical rooms, and electrical rooms. The storage areas, mechanical rooms, and electrical rooms shall receive additional ventilation as specified below for summer cooling. Note, all communication room shall be provided with mechanical cooling and positively pressurized.

1.3.2.5 Humidity

Humidity shall not be directly controlled in any space during the cooling season. Humidity control shall be limited to 50% relative humidity through good selection of the cooling coil. In the heating season, all spaces occupied by children shall be humidified to maintain a minimum relative humidity of 35%.

1.4 HVAC Load Calculations.

This Section contains instructions and engineering requirements relating to the design of the new HVAC supply and distribution systems. The design of all systems shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks, Terminology of HVAC&R guide and to the requirements of NFPA Standards Nos. 90A. Calculations shall be provided for all mechanical equipment such as boilers, heating & cooling coils, condensing units, unit heaters, piping, pumps, expansion tanks, fans, ducts, louvers, gas services and piping, plumbing, water heaters, and etc. Design Energy Usage shall meet or be below Energy Use Budget target(see paragraph ENERGY USE BUDGET (EUB) COMPLIANCE CHECK).

1.4.1 Safty Factors

A 20% safety factor shall be applied to the total room-heating load. A 10% safety factor shall be applied to the total room-cooling load.

1.4.2 Infiltration Rates.

All outdoor air shall be introduced into the occupied portions of the buildings through the air handling unit or the blower coil unit. Therefore, all occupied spaces shall be positively pressurized. However, for the purposes of sizing equipment, an infiltration rate of 0.5 air changes per hour (ACH) shall be included for all rooms with an exterior exposure. A rate of 4 ACH shall be allowed for the vestibules. The infiltration rate for the artium areas shall be assumed to be localized to the adjacent area of the exposed surface. (Such as the volume within 4m of the door or the volume of the clear story only.)

1.4.3 Building Thermal Properties.

Building thermal properties used in construction and design of Child Development Center - School Age shall be as follows;

Coefficient of Heat Transmission ("U" Value)
Roofs 0.18 W/square m - degree C
Walls 0.36 W/square m - degree C

Windows 1.74/1.81 W/square m - degree C (winter / summer) Exterior doors shall be hollow metal with rigid insulation cores.

These values represent the minimum acceptable level of building insulation. The mechanical designer shall verify the actual building materials meet or exceed these values. If the building envelop fails to meet these levels, the mechanical designer shall inform the Contractor, the Architectural designer and the Contracting Officer's representative of the condition and recommended corrective action. A copy of all calculations shall be included in the design submittal.

1.4.4 Computer Programs.

Capacity of heating and cooling systems shall be based on load calculations for individual spaces as well as block loads. Heat loss and heat gain calculation shall use actual design U-values. All calculations shall be based on ASHRAE methods as computed by a commercially recognized computer HVAC loads program i.e., Elite Software Inc., Trane Trace Load 700, Carrier E20-II Hourly Analysis Program (HAP) version 3.04. A copy of all load calculations, both input and output, shall be included in the design submittal.

1.4.4.1 Heating Safety Factor

A 20% safety factor for heating shall be included in the HVAC load calculations.

1.4.4.2 Cooling Safety Factor

A 10% safety factor for cooling shall be included in the HVAC load calculations.

1.4.5 Internal Heat Gains for Cooling Calculations

All installed electrical equipment shall be assumed to impose 100% resistive heating load on the space except as indicated below for return air plenums.

1.4.5.1 Lighting Loads

The heat gain from space lighting loads shall be coordinated with Electrical Design Engineer (see Section 01017 ELECTRICAL REQUIREMENTS). Where the space above the ceiling is a return air plenum, than a minimum of 70% of the heat gain from the lights shall be assumed to place a direct load on the space. A maximum of 30% of the heat gain from the lights shall be assumed to place a direct load on the return air plenum.

1.4.5.2 Communication Equipment Loads

The heat gain from the communication equipment installed in the communication equipment rooms shall be coordinated with Electrical Design Engineer (see Section 01017 ELECTRICAL REQUIREMENTS).

1.4.5.3 PC/monitor/printer Loads

The heat gain from each PC/monitor/printer combination shall be 240 watts total per station.

1.4.5.4 People Loads

The heat gain from people shall be 75 Watts/person sensible and 70 Watts/person latent for walking and standing per ASHRAE Handbook of

Fundamentals.

1.4.5.5 Solar, Transmission, conduction, slab loads etc Loads

The heat gain from solar sources shall be as shown in ASHRAE Handbook of Fundamentals.

1.4.6 Block Loads

Provide block loads on the facility to be used for boiler, chiller and fluid cooler sizing. Block loads shall be based on interior design setpoints specified above. The load imposed by all specified ventilation shall be included in the block loads.

1.4.6.1 Heating Block Load

The total capacity of all boiler modules shall be equal to the peak winter heating load as calculated for the Winter Heating Design Dry Bulb specified above with a piping losses allowance of 15 percent for heating.

1.4.6.2 Summer Cooling Block Load

The chiller shall have a minimum capacity equal to the peak summer cooling load as calculated for the Summer Cooling Design Dry Bulb and Wet Bulb specified above with all spaces fully occupied with the chiller operating in ambient air of 40 degrees C.

1.4.6.3 Winter Cooling Block Load

The fluid cooler(s) shall have a minimum capacity equal to the winter cooling load as calculated for the Winter Cooling Design Dry Bulb and Wet Bulb specified above with all spaces fully occupied with the fluid cooler(s) operating in same ambient air as the load calculations.

1.4.7 Preliminary Calculations.

The preliminary heating and cooling loads calculations were preformed by the government during the Life Cycle Cost Analysis utilizing the methods specified above with the ELITE HVAC loads computer program. The supply air rates listed in the ventilation select below were based on these calculations and further psychometric calculations that resulted in a cold deck supply air temperature of 11.1 degrees C. These calculations are preliminary. The designer shall be responsible for all calculations used in the actual design of all systems.

1.5 Ventilation.

1.5.1 Mechanical Ventilation.

The design shall insure that indoor air quality shall be maintained for all occupants during the occupied periods. Mechanical ventilation shall be provided to the buildings in strict accordance with ASHRAE Ventilation Standard 62. The maximum ventilation rate per system shall be calculated using the Ventilation Rate Procedure. The outside air rates for each system shall be corrected for multiple spaces as required by ASHRAE Ventilation Standard 62. A complete room by room ventilation analysis for each AHU shall be included in the design submittal.

1.5.2 Pretreated Outside Air.

Pretreated outside air shall be provided directly to the occupied spaces with high critical Z's as defined by ASHRAE Ventilation Standard 62 to reduce the total amount of outside air required by the building.

1.5.3 Preliminary Ventilation Calculations.

The preliminary room by room ventilation analysis was preformed by the government during the Life Cycle Cost Analysis utilizing the methods specified above with the MICROSOFT EXCEL computer spreadsheet program. The ventilation calculations and supply air rates listed below are preliminary. The designer shall be responsible for all calculations used in the actual design of the system. The designer shall include in the design submittal, using actual room supply air volumes, the same room by room calculations in the same format as shown. The outside air rates per person where taken from ASHRAE Ventilation Standard 62 and shall be as shown. All unoccupied spaces shall be provided with a minimum outside air flow rate fall of 0.25 L/s per square meter.

1.5.4 Combustion Air

The mechanical equipment rooms containing gas burning equipment that is not directly vented to the outdoors for both combustion air and combustion by-productst shall be provided with combustion air louver sized and located in accordance with NFPA 54. Care shall be taken in design in order to minimize the potential for piping freeze-up in the mechanical room due to combustion air intake.

1.5.5 Building Exhaust.

A undercut door and/or transfer duct shall be required to allow for replacement air when required make-up air is specified to be transfered from adjoining spaces.

1.5.5.1 Toilet Exhaust.

The toilets shall be supplied with 25 L/s of exhaust per water closet or urinal as required by ASHRAE Ventilation Standard 62 or a minimum of 10 air changes per hour, which ever is greater. The required make-up air for the exhaust system shall be transfered from adjoining spaces or supplied by the multizone system to supply air for the space heating loads. Maximum supply air rate shall be limited to 90% of the exhaust air rate.

1.5.5.2 Janitors Closet

The janitors closet shall be exhausted at the rate of 10 L/s per square meters in order to maintain a negative room pressure. The required make-up air for the exhaust system shall be transferred from adjoining spaces.

1.5.5.3 Kitchen Exhaust

The volume of air exhausted within the kitchen shall be as required by the kitchen equipment to control heat, humidity and grease vapor release into the kitchen. At a minimum, the exhaust valume shall be as specified in Industrial Ventilation.

1.5.5.4 Laundry Dryer Exhaust.

The dryer, when operating, shall be assumed to exhaust 100 L/s of air from

the laundry. The dryer vent shall not exceed a total combined horizontal and vertical length of 4200 mm, including two 90-degree elbows. Make-up air shall be transferred from the adjacent spaces for gas-fired dryer.

1.5.5.5 Summer Ventilation.

Ventilation shall be supplied in all parts of the building that do not receive summer cooling via mechanical cooling (i.e. the mechanical, electrical, and storage rooms). The space shall be ventilated and cooled with outside air by thermostatically controlled fans. The fans shal be set to operate when the respective space temperature exceeds 30 degrees C. The volume of air supplied shall be calculated using an assumed delta temperature of 5 degrees C or a minimum of 10 air changes per hour. A copy of all calculations shall be included in the design submittal.

1.5.6 Building Pressurization

Entire building shall be pressurized to reduce infiltration. A building air balance calculation shall be included with the complete room by room ventilation analysis for each AHU specified above. A relative positive or negative pressurization shall be as specified below:

1.5.6.1 Restrooms, Janitor's Closet and Luandry

The restrooms, janitor's closet and luandry shall be maintained at a negitive pressure relative to the rest of the facility. Supply air to these rooms shall be limited to the smaller volume of volume required to meet the heating load or 90 percent of the exhaust air volume. Remaining exhuast air shall be transferred from adjacent spaces.

1.5.6.2 Kitchen

The kitchen, including the scullery and storage areas, shall be maintained at a negitive pressure relative to the rest of the facility. The outside air for the rest of the facity shall not be increased above the minimum required by ASHRAE Ventilation Standard 62 to provide make-up air for the kitchen exhaust hoods. A seperate make-up air unit shall be provided as specified below.

1.5.6.3 Communication Rooms.

Communication rooms shall recieve filtered conditioned relief air transfered from the main ceiling plenum into the communication rooms to maintain the space under positive pressure.

1.5.7 Building Envelop Penetrations.

All building envelop penetrations for ventilation, supply, exhaust and relief, shall be provided with low leak motorized control dampers to maintain a tight building envelop anytime the ventilation is not required.

1.5.7.1 Building Outside Air Intakes.

Air intakes to heating, ventilation, and air conditioning (HVAC) systems shall be located at least 3 meters above the ground. Building envelop penetrations for outside air intake shall be located in the roof and/or clear story walls. A minimum of 10 m shall be maintained between outside air intakes and any boiler exhaust vents, plumbing vents, the exhaust air or relief air penetrations. If feasible, locate intakes and exhausts on

different building faces.

1.5.7.2 Building Relief Air.

All building relief air shall not be returned to the air handling units prior to being relieved or exhausted from the building. Building relief penetrations shall include a gravity backdraft damper in series with the motorized control damper required above.

1.6 Force Protection

In addition to the requirements listed below, the mechanical design shall include the following measures for force protection:

1.6.1 Emergency Shutoff or Kill Switch

Provide an emergency shutoff switch in the HVAC control system that can immediately shut down air distribution throughout the building. The switch (or switches) must be located to be easily accessible by building occupants. The actual location shall be determined during design. If the occupant so directs, than the switch shall be located the greatest distance possible from the equipment location.

1.6.2 Utility Service Entrance

For all new inhabited buildings, route critical or fragile utilities so that they are not on exterior walls. Secure exterior access to gas mains, and water supplies with manual shut-off valves.

1.6.3 Building Outside Air Intakes.

Air intakes to heating, ventilation, and air conditioning (HVAC) systems shall be located at least 3 meters above the ground.

1.6.4 Equipment Bracing

Mount all overhead utilities and other fixtures to minimize the likelihood that they will fall and injure building occupants. Design all equipment mountings to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction. This standard does not preclude the need to design equipment mountings for forces required by other criteria such as seismic standards.

1.7 Seismic Protection

The facility is to be considered seismic use Group II, seismic design Category B, Non Essential and site classifications indicated in Section 01015 STRUCTURAL REQUIRMENTS.

1.7.1 Fire Protection Systems

Seismic protection for sprinkler systems for fire protection systems shall be as required by the current issue of the National Fire Protection Association NFPA 13.

1.7.2 All Other Mechanical Systems and Equipment

All other mechanical equipment, piping and ductwork shall be provided with seismic protection as required by TI 809-04, Seismic Design for Buildings

and FEMA 302.

1.7.3 Materials and Installation

When seismic protection is required, the seismic restraints shall be designed in accordance with UFGS Section 13080A, SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT and shall meet the requirements of Section 15070A, SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT.

1.8 Mechanical Insulation Systems

Insulation requirements of new mechanical systems, including insulation of plumbing systems and equipment, hot water piping systems, chilled water piping systems and equipment, and the insulation of the duct systems shall meet the requirements of Section 15080ATHERMAL INSULATION FOR MECHANICAL SYSTEMS. All hot and chilled water piping shall be insulated. Hot water piping shall be required to follow tabulated thicknesses. Domestic hot and cold water piping shall be insulated. All ducts shall be insulated in the mechanical rooms. All supply and outside air ducts shall be insulated regardless of location. Cold piping and ductwork shall have a vapor barrier. High abuse areas shall have aluminum jackets such as janitor closets and mechanical rooms etc.

1.9 Natural Gas Piping System.

The facility shall be provided with natural gas. This Section contains instructions and engineering requirements relating to the design of new interior natural gas piping systems. Interior gas piping systems shall extend from the outlet of the gas service regulator/meter assembly to the point of connection of each gas utilization device. Natural gas shall be provide to the boilers, domestic hot water heater, and the gas-fired clothes dryer. Natural gas shall be provide for food service equipment requiring gas in Section 01014INTERIOR DESIGN. The aboveground gas piping system shall be designed, sized and installed in accordance with TM 5-810-6 and NFPA 54.

1.9.1 Gas Service Entrance

The gas service shall not be located on the front elevation of any building. The gas service shall be located as far from the front elevation of any building as practical.

1.9.2 Gas Piping

Piping shall be sized in accordance with NFPA 54 to supply the demand without excessive pressure drop between the point of delivery and the gas utilization equipment. The maximum pressure loss from the outlet of the meter set at the building's service enterance to the inlet of the individual appliance pressure regulators shall be 1.4 kPa. The calorific value of the natural gas to be used in calculations for sizing equipment and piping is 31300 KJ per cubic meter. Design for all piping for all systems, valves, regulators, etc. shall be per applicable industry criteria and standards and as referenced in above. All materials used for piping, valves and miscellaneous equipment shall meet or exceed the calculated design pressures, loads and stresses for each system. During design of the piping systems, consideration shall be given to future operations and maintenance activities. All systems shall be capable of being maintained with a minimal amount of disassembly of all assemblies and sub-assemblies. Interior piping shall be black steel as specified in Section 15190A, GAS

PIPING SYSTEMS. Minimum interior gas pipe size shall be 20 mm. Gas piping shall be shown on the mechanical HVAC Drawings. The following items shall be provided as part of the building's natural gas system in the order listed below;

1.9.3 Safty Device

A seperate automatic shut off device shall be located upper stream of both regulators at the service enterance to the building. The safty device shall be a mechanical, pilot operated device which does not require electrical power to operate. The pressure sensing element of the pilot operated device shall be located down stream of first regulators to cut off gas flow if the supply pressure to the building exceeds the safe inlet pressure to all down stream regulators.

1.9.4 Building Regulator

Natural gas shall be distributed to the building at about 275 kPa. The designer shall verify the actual gas pressure in the existing gas main. Natural gas shall be distributed within the building at about 14 kPa. The building regulator shall have a maximum turn down ratio of 20 to 1.

1.9.5 Gas Meter

The facility shall be provided with a gas meter.

1.9.6 Appliance Regulator

Each piece, except as noted below, of equipment which is fired by natural gas shall be provided with a separate gas pressure appliance regulator to reduce the gas pressure to the value as recommended by the manufacture of the gas burning appliance. When multiple pieces of the identical gas burning equipment, such as boilers, are to be installed in the same room a single appliance regulator shall be provided for the group of identical equipment. Other equipment with in the same room maybe combined onto a common appliance regulator if all equipment served by the common appliance regulator require the same inlet gas pressure.

1.9.7 Equipment Connections

The final connection to gas equipment shall be made with rigid metallic pipe and fittings. Accessible gas shutoff valve and coupling are required for each piece of gas equipment.

1.10 Plumbing System.

This Section contains instructions and engineering requirements relating to the design of the new plumbing systems as required. A plumbing system consists of the Drain Waste and Vent system (DWV) system; the domestic hot and cold water supply distribution system to the various plumbing fixtures; and the Domestic Hot Water Heating System; make-up water piping to the various hydronic type environmental control systems; make-up water to Food Service Equipment, fixtures, and traps; and shall extend from connections within the structure to a point 1.5 meters outside the structure. The design of all plumbing systems shall, unless otherwise stated herein, comply with the most current TM 5-810-5 and International Plumbing Code (IPC) and shall meet the requirements of Section 15400APLUMBING, GENERAL PURPOSE. The quantity of plumbing fixtures shall be as shown on the contract Architectural drawings. The designer shall submit for review all

plumbing calculations demonstrating his pipe sizing methods and assumptions.

1.10.1 Piping Runs

Piping runs in buildings shall be arranged to not interfere with movement of personnel and equipment. Neither water nor drainage piping shall be located over electrical equipment or panels. Domestic water piping located outside of mechanical equipment areas shall be routed in the ceiling space above the corridors. Water and waste piping shall not be located in exterior walls or other spaces where there is possibility of freezing. Where piping is to be concealed in wall spaces or pipe chases, such spaces shall be checked to insure that clearances are adequate to properly accommodate the piping.

1.10.2 Soil, Waste and Vent Piping System.

Horizontal soil and waste piping shall be installed at a uniform pitch in accordance with the International Plumbing Code (IPC) in the buildings. Soil, waste and vent stacks shall be located to serve each fixture or group of fixtures depending on fixture proximity to stack. Material type shall be as specified in Section 15400A, Plumbing, General Purpose.

1.10.2.1 Piping Invert Elevations

All building underslab piping elevations should be shown on the drawings. Verify that the pipe elevations do not conflict with building structural footings and foundations walls.

1.10.2.2 Floor Drains

The mechanical equipment rooms shall be provided with sufficient floor drains to accommodate routine maintenance and drain down of equipment and piping within the room without running drain pipes over the floor. In addition, a floor drain shall be provided in the laundry room, mechanical room, each child toilet, kitchen, dry storage, dishwashing & ice machine areas, and janitors closet. Floor drains in the Kitchen shall be of the floor sink type. A floor sink shall be provided for each indirect waste or drains. Multiple indirect wastes may be routed to a single kitchen floor sink where the local code allows. To prevent traps from drying out, deep seal traps shall be provided on all floor drains.

1.10.2.3 Cleanouts

On straight runs of pipe, cleanouts shall be provided at not more than 15 meters apart. Cleanouts shall be provided at each change of direction of pipe and shall be provided at the base of all storm, soil, waste, and vent stacks.

1.10.2.4 Kitchen Grease Interceptor

A grease interceptor in the Kitchen sewer system shall be provided, for the three-compartment sink and may be provided for all Food Service direct or indirect waste drains, the rinse to the sanitize basin's waste shall be connected to the sanitary system. Construction of trap, interceptor minimum size and installation (interior or exterior) shall conform to local code requirements. Unit shall meet the requirements of PDI Standard PDI-G101, shall be installed flush with the floor. Minimum capacities shall be 4.7 L/s, 330.6 kg grease, 398 liters holding volume and 100 mm threaded outlet unless otherwise required by local codes. Size depends on

volume of fixtures, capacity in liters and drainage period of 1 minute.

1.10.2.5 Plumbing Vents

Where feasible, combine circuit vents in a concealed space to a main vent through the roof in lieu of an excessive number of individual vents through the roof. All vent lines through roof shall be 100 mm and terminate with a minimum of 150 mm above finished roof. Where vents connect to horizontal soil or waste lines, the vent shall be taken off so that the invert of the vent pipe is at or above the centerline of the horizontal soil or waste pipe.

1.10.3 Domestic Potable Water System.

Domestic potable water pipe sizing criteria shall be based on a system supply pressure, residual pressure, and flow rate to provide a minimum of 175 kPa at the most hydraulically remote fixture. The system supply pressure, residual pressure, and flow rate as specified in Section 01018, FIRE PROTECTION REQUIREMENTS. Water service entrance shall be sized for the maximum probable demand. Water piping shall be designed not to exceed a velocity of 2.4 meters per second at full flow. All domestic potable water piping shall be nonferrous as specified in Section 15400A, Plumbing, General Purpose. All materials used for piping, valves and miscellaneous equipment shall meet or exceed the calculated design pressures, loads and stresses for each system. During design of the piping systems, consideration shall be given to future operations and maintenance activities. All systems shall be capable of being maintained with a minimal amount of disassembly of all assemblies and sub-assemblies.

1.10.3.1 Water Service Entrances

New water service entrances shall be provided with a water meter and isolation valves located inside the building. Meters shall be provided with a direct non-resettable, digital readout. Meters shall have a pulse switch initiator capable pulse output of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments or 4-20 mA output. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. Meters shall be connected to the EMCS system.

1.10.3.2 Protection of Water Supplies

Cross connections between water supply piping and waste, drain, vent, or sewer piping are prohibited. Exterior water fountains shall be connected to the domestic water to the building and be provided with a reduced pressure principle type backflow preventor. Reduced pressure type backflow preventers shall be provided on all make-up water systems. All backflow preventers shall be installed for accessibility per International Plumbing Code (IPC) and shall comply with the requirements of the State of Kansas regulations. State licensed plumbers shall install and/or test backflow preventors and cross connections devices. For Fire Protection backflow preventor requirements see Section 01018FIRE PROTECTION REQUIREMENTS.

1.10.3.3 Water Hammer Arresters

Commercially available water hammer arresters shall be provided at all new quick closing valves such as flush valves and solenoid valves and shall be installed according to manufacturers recommendations. Vertical capped pipe columns in lieu of water hammer arresters are not permitted.

1.10.3.4 Freeze-Proof Free Standing Exterior Drinking Fountains

Exterior freeze-proof free standing exterior drinking fountains shall be provided in each exterior play area as indicated. Supply piping drops within the facility shall be installed within interior partitions to eliminate freeze potential. An accessible shut off valve shall be provided on the supply piping within the facility. Supply piping between the building and the drinking fountain shall be as specified for water service lines in Section 01012, SITE WORK/CIVIL/UTILITIES. The drinking fountain shall be provided with a freeze resistant valving system, which provides for water shut off below the frost line from the bubbler control mechanism. Any water remaining above the valving system shall be self-draining to prevent freeze ups. Waste from the exterior drinking fountain shall drain into the buildings storm drainage system.

1.10.3.5 Freeze-Proof Wall Hydrants.

Exterior freeze-proof wall hydrants with vacuum-breaker-backflow-preventer shall be provided on the exterior of the buildings to accommodate a maximum hose length of 30M. Wall hydrant drops shall be installed within interior partitions to eliminate freeze potential. A wall hydrant shall be provided near all Mechanical Room's exterior doors. Exterior wall hydrants shall be mounted 600 mm above finished grade.

1.10.3.6 Wall Faucets

An interior wall faucet shall be provided in all Mechanical Rooms. Wall faucets shall be mounted 900 mm above the finished floor.

1.10.3.7 Service Stop Isolation Valves

For normal maintenance or replacement, servicing stop isolation valves shall be installed in water connections to all installed new equipment and new fixtures. In addition, stop valves shall be provided to isolate portions of systems so as to not require shutdown of entire systems. Stop isolation valves for piping and equipment shall be shown on the drawings. Service stop isolation valves to faucets shall meet ANSI/NSF 61, section 9 lead leaching requirements.

1.10.4 Domestic Hot Water Heating System.

Domestic water heating system shall be located in the mechanical equipment rooms. Heater(s) shall be natural gas fired with a combined or separate water storage tank(s). The capacity of the water heater(s) shall be adequate to meet the peak hot water requirements of the facility and shall be designed in accordance with Chapter 48, Service Water Heating, of the 1999 ASHRAE HVAC Applications Manual using criteria specific to schools. The domestic hot water heater(s) and/or storage tank(s) shall be selected to provide the combination of recovery capacity and usable storage capacity to the building as required by ASHRAE. Only 75 percent of the installed storage capacity shall be considered usable in calculating the required recovery rate.

1.10.4.1 Equipment Size Limitations.

Size limit of individual storage tanks or domestic hot water heaters shall be limited to a size that can be removed and replaced through the mechanical room door on a dolly without dismantling the building, the door,

the domestic hot water heater, the storage tank or any other installed mechanical equipment, piping or ductwork.

1.10.4.2 Domestic Cold Water Inlet Temperatures.

An inlet water temperature of 10 degrees C. shall be used for sizing the water heaters.

1.10.4.3 Domestic Hot Water Supply Temperatures.

Domestic hot water shall be supplied to the building for general use at a temperature of 30 degrees C. In no case shall hot water supplied for general use be allowed to exceed 43 degrees C. Domestic hot water shall be supplied to the demostration kitchen, which is to be used by children, at the same temperature as for general use. Domestic hot water shall be supplied to the main kitchen and laundry room at a temperature of 60 degrees C. Internal booster heaters shall be included in the dish washing equipment and pot/pan sink as specified in Section 01014, Interior Design.

1.10.4.4 Domestic Hot Water Storage Temperatures.

Water storage temperature shall be 60 deg. C. as a minimum to prevent bacterial growth within the tank.

1.10.4.5 Temperature Mixing Valves

When temperature mixing valves are provided to supply domestic hot water at a temperature lower than the storage temperature, the system shall be designed and installed with a dual path for the recirculated water flow. The recirculated water's flow path shall be directly into the cold water inlet of the mixing valve and the cold water inlet of storage tanks and/or heater. The recirculated water's flow path shall not be limited to a single path directly into the cold water inlet of storage tanks and/or heater and from there into the cold water inlet of the mixing valve since this will create operational problems when there is no demand for domestic hot water at any plumbing fixture in the system.

1.10.5 Domestic Water Pumps.

Domestic hot water pumps shall be all bronze centrifugal pumps. Pumps and motors shall be properly sized for the application required. Pump capacity, efficiency, motor size, speed and impeller types shall be optimized for the application. Pump motor shall have the required capacity to prevent overloading with pump operating at any point on its characteristic curve. Pumps and motors shall operate at 1800 RPM (maximum).

1.10.5.1 Domestic Water Circulation Pumps.

When seperate heater and storage tanks are provided, one or more individual domestic hot water pumps shall be provided to circulate hot water between the hot water storage tanks and the heater seperate from the domestic hot water recirculation pump.

1.10.5.2 Domestic Water Recirculation Pumps.

Each domestic hot water system shall have a domestic hot water recirculation pump to recirculate 315 mL/s of domestic hot water from within a minimum of 15 m of every plumbing fixture that utilizes hot water within the building and back to the heating system. The system shall

continually circulate domestic hot water in order to insure that domestic hot water is available at each fixture without delay. In buildings operated on a nominal 40-hour week or on a nominal two-shift basis (either a 5-or a 7- day week) a clock or other automatic control shall be installed on domestic hot water circulation pumps to permit operation only during periods of occupancy plus 30 minutes prior.

1.10.5.3 (Re)Circulation Pipe Sizing Criteria.

The piping systems shall be sized to limit pressure loss and noise. Pipes 65~mm and larger shall be sized for a maximum pressure loss of 4~m in 100~m. Pipes 50~mm and smaller shall be sized for a maximum velocity of 1.3~m/s.

1.10.5.4 Computer Program or Spreadsheet.

The pressure loss, velocity and volume of each piping segment shall be calculated by a computer program/spreadsheet, based on the actual pipe material installed for each piping segment. The computer program/spreadsheet shall calculate the pressure loss through each and every individual flow path of each system to determine the maximum pressure lost of the system. The computer program/spreadsheet shall also calculate the total system volume. A copy of all calculations, both input and output, shall be included in the design submittal.

1.10.6 Plumbing Fixtures.

Plumbing fixtures shall conform to ASME standards and Executive Order 12902 with lead-free faucets. End-point devices shall meet lead leaching requirements of ANSI/NSF 61, section 9, lavatory faucets, kitchen and bar faucets, supply stops and endpoint control valves. All plumbing fixtures shall be the water conservation types as specified in Section 15400A, Plumbing, General Purpose.

1.10.6.1 Building Specific Plumbing Fixtures

Specific customer requirements for plumbing fixtures and mounting heights shall be as specified in Section 01014, Interior Design. Standard fixture mounting heights shall be as specified in Section 15400A Plumbing, General Purpose.

1.10.6.2 Children's Faucets

Faucets for children shall be automatic type as specified in Section 01014, Interior Design. Faucets for children shall have electronic sensors. Hot water to children's electronic faucets shall have a mixing valve set to maintain 30 deg. C. with temperatures not to exceed 43 deg. C. Faucets with maximum temperature limit settings shall be provided. All faucets shall be 100% lead-free (no brass allowed).

1.10.6.3 Washer Connections

Washer Connection - Drainage and hot and cold water supply shall be provided for the (GFGI) automatic clothes washers. Washer connection, complete with 50 mm drain, 20 mm hose thread supplies, and electrical outlets for both washer and gas-fired dryer, shall be provided in a standard manufactured recessed wall box with single-face plate. Box shall be constructed of sheet steel and shall have a corrosion-resistant epoxy enamel finish. Boxes shall be mounted 1.2 meters above the finished floor.

Finish color shall be painted to match adjacent finishes.

1.10.6.4 Janitor Closet Sinks

A enameled cast iron floor mounted type service sink shall be provided in all janitor closets. Overall sink dimensions shall be approximately 700 mm x 700 mm. The depth of the floor sink bowl shall be approximately 250 mm.

1.10.7 Storm Drainage

Where required storm drainage system shall include roof drains, overflow drains, leaders, and conductors within the building to a point 1.5 m outside the building. Where required by the architectural drawings, roof drains, with auxiliary overflow drains, shall be provided at the low points of the roof. Storm water shall be routed through interior downspouts and piped directly to the facility storm drainage system. Roof drains shall be designed for a maximum rainfall rate of 111 mm per hour and shall be sized in accordance with the International Plumbing Code (IPC). All elbows for the storm drainage and overflow drainage piping 250 mm and smaller shall be 90 degree short sweep elbows.

1.10.8 Cathodic Protection

Cathodic protection shall be provided for any new underground metallic piping, fittings, and valves except cast iron. Design of cathodic protection system shall in accordance with Section 01017 ELECTRICAL REQUIREMENTS, paragraph entitled "Cathodic Protection".

1.11 Steam System

When steam is the selected energy source for the dry steam humidifiers, than a seperate steam boiler, steam and condensate piping, steam traps, steam to steam heat exchanger, boiler feed unit and water softener shall be provided as required to provide chemical free dry steam to the humidifer's dispersion tubes. Gas Fired Pulse Steam Boiler and all steam system componets shall be as specified in Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH. Chemical treatment shall be provided for the steam boiler. A steam to steam heat exchanger shall produce chemical free steam for humidification.

1.12 General Hydronic Systems.

System, equipment and calculation requirements listed below shall be required for both the heating and cooling hydronic systems. The building distribution piping shall be direct return with automatic flow control valves or shall utilize reverse return configuration. The material and installation requirements for items common to both systems shall be as specified in UFGS Section 15569A WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH.

1.12.1 Flow Medium.

The hot and chilled water system designs shall include safeguards to protect against freezing damage. The flow medium for both the hot and chilled water systems shall be a mixture 40% propylene-glycol.

1.12.2 Computer Program or Spreadsheet.

The pressure loss, velocity and volume of each piping segment shall be

calculated by a computer program/spreadsheet, based on the actual pipe, fitting, and valve material installed for each piping segment. The pressure loss calculations shall include the actual pressure loss through each valve such as control valves, triple duty valves, shut off valves, etc, based on the valve Cv. The designer shall show the valve Cv used in the hydronic calculations on the construction drawings. The computer program/spreadsheet shall calculate the pressure loss through each and every individual flow path of each system to determine the maximum pressure lost of the system. The computer program/spreadsheet shall also calculate the total system volume. A copy of all hydronic calculations, both input and output, shall be included in the design submittal.

1.12.3 Piping

The hot and chilled water piping shall be as specified in UFGS Section 15569A WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH.

1.12.3.1 Pipe Sizing Criteria.

The hydronic piping systems shall be sized to limit pressure loss and noise. Pipes 65 mm and larger shall be sized for a maximum pressure loss of 4~m in 100~m. Pipes 50~mm and smaller shall be sized for a maximum velocity of 1.3~m/s.

1.12.3.2 Piping Material.

All materials used for piping, valves and miscellaneous equipment shall meet or exceed the calculated design pressures, loads and stresses for each system. During design of the piping systems, consideration shall be given to future operations and maintenance activities. All systems shall be capable of being maintained with a minimal amount of disassembly of all assemblies and sub-assemblies. The technical specifications contain more than one possible material type. If the material type or valve Cv for any one piping segment is changed after the hydronic calculations for a given system have been calculated. The entire system shall be recalculated, as specified above, based on the actual materials installed and the pump shall be reselected.

1.12.3.3 Piping Slope

All piping shall be pitched up in the direction of flow, shall be designed without pockets which would permit accumulation of air, and shall be provided with vents at high points and drains at low points. Piping located outside of mechanical equipment areas shall be routed in the attic or in the pipe chases. Slope of piping shall be as indicated in technical specifications.

1.12.3.4 Pipe Expansion

In runs of pipe 15 meters and longer, or in shorter runs where designer deems it is required, indicate size on project drawings the location of all anchors, bends, loops, and pipe guides to adequately limit and provide for pipe expansion. Do not use expansion joints in piping unless absolutely necessary and justified. Anchors and guides shall be indicated on the project drawings and detailed for installation in the building structure provided. STRUCTURAL DESIGN ENGINEER shall be thoroughly informed of all forces generated.

1.12.4 Coils and Terminal Equipment

Provide isolation valves, balancing valve, flow measuring device, and pressure/temperature test taps at all heating and/or cooling units, pumps, and hot water unit heaters. Pipe taps, suitable for use with temperature or pressure probe, shall be located at each pressure gauge. All coils shall be provided with valved drain and air vent connections. A thermometer shall be installed on the supply and return piping to/from each coil. All thermometers shall be legible to service mechanics standing at ground level. Temperature/pressure taps shall be provided on the supply and return piping of each coil. All three-way type control valves shall be provide with a balancing globe valve or cock in the bypass piping.

1.12.5 Pumps.

Pumps and motors for hot and chilled water systems shall be properly sized for the application required. Pump capacity, efficiency, motor size, speed and impeller types shall be optimized for the application. Pump motor shall have the required capacity to prevent overloading with pump operating at any point on its characteristic curve. Pumps and motors shall operate at 1800 RPM (maximum).

1.12.6 Expansion Tanks

A daiphram type expansion tank shall be provided in the hot and chilled water piping systems. The expansion tank's precharge pressure and acceptance volume shall be selected based on the design of the piping systems. The STRUCURAL DESIGN ENGINEER shall be thoroughly consulted before hanging any thing from the building structure.

1.12.7 Air Separation Tanks

The hot and chilled water piping systems shall be provided with an air separation tank. The air separators shall include an automatic air vent and make-up water system, consisting of a pressure reducing valve, strainer, reduced pressure type backflow preventer and isolation valves.

1.12.8 Water Treatment Systems

Provide a mixture of 40% propylene glycol and 60% water into the hot and chilled water piping systems. Provide a shot feeder (chemical feeder) at the hot and chilled water circulating pumps to allow introduction of chemicals into the system. Provide the chemical treatment necessary to protect the system equipment from damage due to corrosion.

1.12.8.1 Chemical Treatment

The water shall be treated to maintain the conditions recommended by the boiler manufacturer. Chemicals shall meet required federal, state, and local environmental regulations for the treatment of boilers and discharge to the sanitary sewer. The services of a company regularly engaged in the treatment of boilers shall be used to determine the correct chemicals and concentrations required for water treatment. The company shall maintain the chemical treatment and provide all chemicals required for a period of 1 year from the date of occupancy. Filming amines and proprietary chemicals shall not be used. The water treatment chemicals shall remain stable throughout the operating temperature range of the system and shall be compatible with pump seals and other elements of the system.

1.12.8.2 Make Up Water

The makeup water conditions reported per ASTM D 596 shall be as specified in Section 15569A WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH. Water softener and water analysis shall be as specified herein for makeup water. A water treatment plan shall also be provided as specified in accordance with Section 15569A WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH

1.13 Hydronic Heating System.

Heating system shall be a forced-air/hot water system consisting of a natural gas fired boilers, water distribution system, circulating pumps, and associated space heating equipment. The hydronic heating system shall provide 100% of the buildings heating requirements for both space and ventilation loads. The use of electric resistance heating is not permitted. The heating system designs shall meet the requirements of UFGS Section 15569 WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH and, unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and Terminology of HVAC&R guide. The hydronic heating system shall be heated by gas fired modular pulse condensing hot water boilers. The boilers shall be located in the mechanical room. The hot water heating system shall be circulated in a primary/secondary arrangement. Individual modular boilers shall be connected to the hot water heating system through full size manifold as shown in the Modular Condensing Boiler Detail. detail shall be included in the construction drawings with actual pipe sizes shown by the designer.) Each modular boiler shall be provided with an individual inline centrifugal boiler pump which shall cycle with the boiler.

1.13.1 Gas Fired Modular Pulse Condensing Hot Water Boilers.

Gas Fired Modular Pulse Condensing Hot Water Boilers shall be as specified in Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH. All boiler modules which serve the same building shall be of the same size. A minimum of three modular boilers shall be provided per building. The boilers shall have a minimum rated efficiency of 90 percent with a return water temperature of 49 degrees C.

1.13.2 Pulse Boilers Venting.

The boilers shall have a flue gas temperature low enough to permit side wall venting. Boiler vents shall be located through the side wall at approximately 700 mm above the finished grade. Maximum separation, as recommended by the boiler manufacture, shall be provided. The boilers shall be individually vented, both intake and exhaust, directly to the outside. Boiler vent exhaust fans shall not be provided. Boiler vents shall not be located on the front elevation of any building. Boiler vents shall be located as far from the front elevation of any building as practical.

1.13.3 Hot Water Supply Temperature.

The system shall be controlled to reset the supply water temperature based on outside air temperature without the use of three-way valves at the boilers. The hot water system shall be designed for a maximum supply temperature of 65 degrees C, a maximum return temperature of 49 degrees C and a minimum return temperature of 27 degrees C. Since the boiler efficiency is an inverse function of the return water temperature, the hot

water return temperature of 49 degrees C was selected by the Government to allow for maximum system efficiency. The Government has successfully operating systems with hot water supply temperatures as low as 65 degrees C. Sufficient coil capacity shall be provided.

1.13.4 Hot Water Pumps.

Hot water centrifugal pump shall be as specified in Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH. In addition to the boiler pumps required above, the building shall be provided with a hot water based-mounted centrifugal pump and standby pump for the hot water heating system. The pumps shall distribute hot water through the building distribution piping to the coils located in air handling units, blower coil units and unit heaters.

1.13.5 Propeller Unit Heaters.

The mechanical and electrical equipment rooms shall be provided with a thermostatically controlled, hot-water, horizontal throw unit heaters to maintain a space temperature of 7 degrees C. minimum. Unit heaters shall be cycled from a space thermostat to maintain the space setpoint. Propeller unit heaters, as specified in Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH, shall be provide to heat the mechanical rooms.

1.14 Hydronic Cooling Systems.

This system shall meet the requirements of UFGS Section 15620A, LIQUID CHILLERS and unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and ASHRAE 15. The hydronic cooling system shall be cooled by one Air Cooled, Rotary Screw Liquid Chiller and one or more Air Cooled Fluid Coolers. This cooling equipment shall be located exterior to the buildings in the mechanical equipment yard adjacent to the mechanical room or as shown on Site Plan sheet C3.1. Chilled water lines between the mechanical room and the mechanical equipment yard shall be run underground. All underground metallic lines, fittings, and valvesshall be cathodically protected in accordance with Electrical Section paragraph entitled "Cathodic Protection".

1.14.1 Air Cooled, Rotary Screw Liquid Chillers.

An Air Cooled, Rotary Screw Liquid Chiller shall be as specified in UFGS Section 15620A, LIQUID CHILLERS. The chiller shall utilize Refrigerant-22. The chiller shall not be operate below 2 degrees C minimum. Chiller shut off shall be at a higher temperature if recommended by the chiller manufacture.

1.14.2 Air Cooled Fluid Coolers.

Air coolers fluid coolers shall be as specified in Section 15620A, LIQUID CHILLERS. The fluid coolers shall be provided for winter cooling. The fluid cooler(s) shall not operate above a maximum temperature equal to the lowest cold deck temperature on that hydronic chilled water system. Chilled water supply design temperature for fluid cooler(s) maybe increased above the chilled water supply design temperature for the chiller providing all AHUs cooling coils have the capacity to meet the coil's cooling load at the Winter Cooling Design Dry Bulb and Wet Bulb with the space fully occupied.

1.14.3 Chilled Water Pump.

Based-mounted chilled water centrifugal pump shall be as specified in Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH. The pump shall distribute chilled water through the building distribution piping to the coils located in the air handling units out to the fluid cooler(s) and the chiller.

1.14.4 Chilled Water Flow Path.

The fluid cooler(s) shall be located upstream of the chiller. The chilled water shall not flow through the fluid cooler(s) when the exterior temperature is above the fluid cooler shut off temperature as specified above. The chilled water shall always flow through the chiller.

1.14.5 Cooling Equipment Operation.

All cooling capacity required by the hydronic system shall be provided by the Air Cooled, Rotary Screw Liquid Chiller when exterior air temperature is above the fluid cooler shut off temperature as specified above. All cooling capacity required by the hydronic system shall be provided by the Air Cooled Fluid Cooler(s) when exterior air temperature is below the chiller shut off temperature specified above. In between these exterior air temperatures, all cooling capacity required by the hydronic system shall be provided by the Air Cooled, Rotary Screw Liquid Chiller and the Air Cooled Fluid Cooler(s) working together.

1.15 Communication Rooms.

Communication rooms shall be provided with individual horizontal, ceiling hung, direct expasion type computer room or fan coil units for filtration, mechanical cooling, heating and pressurization. The unit shall transfer filtered relief air from the main ceiling plenum into the communication room to maintain the space under positive pressure. The unit shall be as specified in Section 15700A, UNITARY HEATING AND COOLING EQUIPMENT.

1.16 Air Supply and Distribution Equipment.

This Section contains instructions and engineering requirements relating to the design of the new HVAC supply and distribution systems. The air supply and distribution system shall inculde all air handling equipment, fans, ductwork, hoods, etc. The design of all systems shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks, Terminology of HVAC&R guide and to the requirements of NFPA Standards Nos. 90A. All HVAC systems shall be designed in accordance with NFPA for fire dampers, smoke dampers and fan shutdown. The designer shall show on the construction drawings all fire or smoke dampers required by NFPA. The materials and installation of the air supply and distribution system shall be as specified in Section 15895A, AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

1.16.1 Three-deck Multizone Air Handling Units.

The building shall be heated & cooled by a three-deck (cold, hot, and bypass) multizone air handling unit. All air handling unit components, except for the dry steam humidifiers, the precool coil module and filter, shall be located within the air handling unit. Coils shall be selected with no more than 3 m/s coil face velocity. Multizone AHUs shall not be

provided with an economizer for space cooling. Only a portion of the ventilation air required by ASHRAE standard 62 shall be supplied by the multizone AHU.

1.16.1.1 Three Deck Multizone Module.

Part or all of the AHU shall be manufacture's standard modular design or a custom design as required to provide a cold deck with cooling coil, a hot deck with heating coil, and a bypass deck in which the air is neither heated or cooled.

1.16.1.2 Three Deck Multizone Zone Control Dampers.

The face and by pass control of the hot deck and the cold deck shall be installed to provide a common by pass path for both the hot deck and the cold deck. There shall be no more than two damper actuators per zone. The design of the individual zone control dampers shall be as required to provide face and by pass control of either the hot deck or the cold deck, a dead band and than face and by pass control of the other deck. Control dampers shall be as specified in Section 15971, DIRECT DIGITAL HVAC CONTROL SYSTEMS.

1.16.1.3 Precool Coil Module.

Located in the outside air path, either within the AHU or in the outside air ductwork, of each AHU shall be a precool coil. Care shall be taken in the design of the system to maintain a minimum velocity through the precool coil as recomended by the coil manufacture. The precool coil shall be modulated to precool the outside air to 15 degrees C when the exterior temperature is above 21 degrees C for moisture removal. The precool coil shall be protected from dirt by a 50 mm pleated filter.

1.16.1.4 Filter Mixing Box.

A filter mixing box with 50 mm pleated filter shall be located between the precool coil module and the preheat coil module.

1.16.1.5 Preheat Coil Module.

Located in the mixed air path of each AHU shall be a preheat coil when the average mixed air temperature is calculated to be below 10 degrees C under winter design conditions. The preheat coil shall be modulated to preheat the mixed air up to the cold deck temperature when the exterior temperature is below 21 degrees C.

1.16.1.6 Return Air Path

Due to the relatively large pressure drop of the filter and cooling coil in the outside air path, a seperate (from the control damper) manual volume damper shall be added to the return air path.

1.16.1.7 Access Sections.

The designer shall show access sections in the AHU where required to provide access for inspection, maintenance and/or control sensor installation.

1.16.1.8 Mandatory Space Zoning Requirements

Each child activity area including the homework center, the computer lab, the multipurpose room and the atruim areas shall be an individual zone. Remaining areas shall be provided with seperate zones for seperate function, perimeter areas and internal areas. The kitchen, including the scullery and storage areas, shall be either a seperate zone on the main air handling system or shall be provided with seperate systems as specified below. It is the government estimate that there shall be between 15 to 17 zones and that at the size of the multizone unit required there will be 15 to 17 zones availible on a single AHU.

1.16.2 Dry Steam Humidifiers

Dispersion tubes shall be provided in the supply air duct of each individual zone, which is occupied by children including the isolation room. The dispersion tubes shall be provided with chemical free dry steam from either a steam to steam heat exchanger or self-contained package type humidifiers. Self-contained package type humidifiers shall be either disposable electrode bottle type or gas-fired type. Gas-fired type humidifiers shall be located within the mechanical room. Humidifier controls shall incorporate a controlling stat, duct high-limit stat, interlock switch to fan motor and/or to sail switch in duct. Humidifier shall be supplied with a steel steam dispersion-tube which provides uniform steam distribution over the entire tube length and shall be supplied at various lengths to adequately span the widest dimension of the duct. Steam supply line to the dispersion tube shall adequately convey steam to the tube and drain any condensate to ensure dry steam in the dispersion tube.

1.16.3 Blower Coil Air Handler.

The Blower Coil Units shall provide tempered (both heated and cooled) outside air (ASHRAE standard 62 ventilation air) directly to spaces with high critical Z's as defined by ASHRAE standard 62. The blower coil shall be arranged so that cooling coil is upstream of the heating coil. Coils shall be selected with no more than 3 m/s coil face velocity. The outside air shall be heated to 21 degrees C. The outside air shall be cooled to the cold deck temperature of the multizone AHU. The Supply volume of the multizone AHU shall be reduced by the volume of pretreated outside air supplied directly to each space. This calculation shall be shown on the Ventilation spreadsheet specified above. Blower coil units shall be located in the mechanical room adjacent to the multizone AHU.

1.16.4 AHU Systems For Kitchen & Dishwashing.

1.16.4.1 Exhaust Hoods

Gease and steam exhaust hoods shall be provided at all cooking equipment and all dish cleaning equipment. An upblast roof exhaust fan serves the compensating kitchen hood(s). The kitchen exhaust fans shall be on separate hood(s).

1.16.4.2 Make-Up Air Unit

The kitchen, including the scullery and storage areas, shall be maintained at a negitive pressure relative to the rest of the facility. The make-up air unit shall be a modular type draw thru unit equipped with a hot water heating coil, face & bypass section and a combination filter/mixing section an is directly ducted to the kitchen hood(s). The make-up air unit shall be interlocked with the compensating kitchen hood exhaust fan, so that it provides make-up air at a minimum 13 degrees C. when the kitchen exhaust

fan is on. The make-up air unit shall also be interlocked with the condensate hood's exhaust fans, so that it provides make-up. The make-up air unit shall be a single zone constant air volume, variable temperature system. Face & Bypass section shall control discharge temperature. During unoccupied "off" hours , the outside air dampers and the exhaust fan's air dampers shall be closed. The make-up air unit shall be located in the mechanical room and/or is suspended from the structure. If the unit is suspended from the structure than a maintainance plateform shall be provided.

1.16.4.3 Seperate Kitchen Air Handling Unit

A seperate single zone air handling unit may be provided for the Kitchen for space heating and spot cooling. The unit shall be a modular type draw thru unit equipped with a hot water heating coil, chilled water cooling coil, and a combination filter/mixing section. The AHU in Kitchen shall be a constant air volume system. The air handling unit provides a constant volume of primary air, at a variable temperature, to the air handling system, the unit runs continuously during occupied times to maintain the space room temperature. During unoccupied hours the air handling unit supply fan cycles to maintain the set back room temperature. The unit shall be located in the mechanical room and/or is suspended from the structure. If the unit is suspended from the structure than a maintainance plateform shall be provided.

1.16.5 Exhaust Systems.

Except for wall mounted propeller units, all fans shall be centrifugal type and connected directly to weather-proof louvers using ductwork. Low leakage motorized dampers shall be provided. In-line fans located outside the main mechanical and electrical areas shall be the provided with a manufacturers standard acoustical enclosure to inhibit noise transmission to the adjoining occupied spaces. Sone value of fans measured 1.5 meters from fan inlet shall be less than 30 sones outside the mechanical equipment room. Sound transmission data shall be submitted for approval by the designer and acceptance at the governments option and design shall indicate noise criteria on schedules.

1.16.5.1 Mechanical Electrical Rooms.

Exhaust or intake fan(s) shall be provided in the mechanical and electrical rooms for summer ventilation as specified above. Intake fans shall be provided when the mechanical room contains gas burning equipment that is not directly vented to the outdoors for both combustion air and combustion by-products. Sidewall mounted fans with exterior louvers shall be provided. The fans shall be controlled by a space mounted thermostat to cycle the fans on when the space temperature rises above 30 degrees C.

1.16.5.2 Toilets.

The restroom exhaust shall be provided through inline exhaust fans, duct systems, and louvers directly to the exterior. Each set (male and female) of restrooms shall be provided with an individual inline centrifugal fan. Exhaust fans shall be provided with a single speed motor.

1.16.6 Condensate Exhaust Hood

The air volume which is exhausted from a kitchen shall be replaced as required by NFPA 96. Air supplied upstream of the hood suction opening

does not qualify as make-up air. The exhaust air flow rate of ventilation of dishwash equipment shall be drawn through the open area between the dishwash machine and the perimeter entrance of the hood. Make-up air diffusers shall be provided the full length of the front panels, at both sides of the hood producing a low velocity discharge. The temperature differential between make-up air and the air in the conditioned space shall not exceed 9 degrees C, except air that is part of the air conditioning system or air that does not decrease comfort conditions of the occupied space. Duct size shall be based on a minimum air velocity of 4.06 meter per second. Duct shall be continuously welded, liquid tight, to hood duct collar as required by NFPA 96.

1.16.6.1 Ducts at Dishwashing Machines

Ducts at dishwashing machines shall consist of two vertical ducts, one at each end of the dishwasher. The intake of each exhaust duct shall be at the top edge of the dishwasher. The exhaust outlet shall be connected to the exhaust system.

1.16.7 EXHAUST HOODS OVER COOKING EQUIPMENT

1.16.7.1 Exhaust Duct

Duct size shall be based on a minimum air velocity of 7.6 meters per second and maximum of 12.7 meters per second. Duct shall be as required by NFPA 96.

1.16.7.2 Integral Make-up Air System

Hood shall be provided with an integral make-up air system which automatically replaces the exhausted air volume that is not transfered from other spaces. The make-up air system shall be in accordance with NFPA 96. Air supplied upstream of the hood suction opening does not qualify as make-up air. The exhaust air flow rate for ventilation of cooking equipment shall be drawn through the open area between cooking surfaces and the perimeter entrance of the hood. Make-up air diffusers shall be provided at the front panel and at the exterior length of the hood producing a low velocity discharge. The temperature differential between the make-up air and the air in the conditioned space shall not exceed 5 degrees C , except for air that is part of the air-conditioning system or air that does not decrease comfort conditions of the occupied space.

1.16.8 Duct Systems Calcualtions.

The velocity and total pressure loss, both velocity and static, of each duct segment shall be calculated by a computer program/spreadsheet, based on the equal friction method or by T-method Optimization as described by ASHRAE. The computer program/spreadsheet shall calculate the pressure loss through each duct segment for each and every individual flow path and determine the maximum pressure loss of the system. The computer program/spreadsheet shall perform calculations based on the actual material installed. A copy of all duct calculations, both input and output, shall be included in the design submittal.

1.16.8.1 Duct Pressure Classification

The designer shall indicate the duct pressure classification for each duct segment on the construction drawings. All ductwork shall be sealed to seal class ${\tt A}.$

1.16.8.2 Diffusers, Registers and Grilles.

Supply diffusers and registers shall be sized for a maximum total pressure (velocity and static) loss of 35 Pa and a maximum noise criteria (NC) of 30. Return, exhaust and relief registers and grilles shall be sized for a maximum total pressure (velocity and static) loss of 25 Pa and a maximum noise criteria (NC) of 20.

1.16.8.3 Supply Duct Systems Maximum Friction Rate.

Supply duct friction rate for the equal friction method shall not exceed $0.8~{\rm Pa/m}$.

1.16.8.4 Return and Exhaust Duct Systems Maximum Friction Rate.

Exhaust duct friction rate for the equal friction method shall not exceed $0.6~{\rm Pa/m}$.

1.16.8.5 Positive Pressure Duct Velocity.

Except for relief duct and openings, the maximum velocity for ductwork under positive pressure shall be limited as specified below. Building relief duct and openings shall be sized for a maximum velocity of 1.5 m/s.

- a. Areas with Exposed Ductwork. For areas with exposed ductwork or dustwork above an open grid type ceiling, the maximum main air duct velocity shall be 6 m/s for rectangular duct and 11 m/s for round duct. Branch air ducts maximum velocity shall be 80 percent of the velocity values specified above for main air ducts. The maximum velocity for runouts to outlets shall be 50 percent of the velocity values specified above for main air ducts.
- b. Areas with Gypsum Ceilings. For ductwork located within the ceiling space above a gypsum ceilings, the maximum main air duct velocity shall be 10 m/s for rectangular duct and 15 m/s for round duct. Branch air ducts maximum velocity shall be 80 percent of the velocity values specified above for main air ducts. The maximum velocity for runouts to outlets shall be 50 percent of the velocity values specified above for main air ducts.
- c. Areas with Acoustical Ceilings. For ductwork located within the ceiling space above a acoustical ceilings, the maximum main air duct velocity shall be 7 m/s for rectangular duct and 13 m/s for round duct. Branch air ducts maximum velocity shall be 80 percent of the velocity values specified above for main air ducts. The maximum velocity for runouts to outlets shall be 50 percent of the velocity values specified above for main air ducts.
- 1.16.8.6 Negative Pressure Duct Velocity.

For ductwork under negative pressure the maximum velocity shall be limited to 80 percent of the value specified above for positive pressure ductwork except that transfer air openings and return air openings from return air plenums shall be sized for a maximum velocity of $1.5~\mathrm{m/s}$. Return air openings from return air plenums shall be with bell-mouth type entrances into the return duct system.

1.16.8.7 Duct Fitting Pressure Loss Coefficients.

Pressure loss through ductwork fittings shall be determined utilizing both methods and coefficients as presented in the ASHRAE Duct Fitting Database. Fitting types that are not part of the ASHRAE Duct Fitting Database shall not be designed provided or installed. The designer shall show, on the drawings, the fitting type used in the system calculations.

1.16.9 Ductwork Componets.

1.16.9.1 Acoustical Duct Liner.

Acoustical Duct Liner shall not be provided. To the maximum extent possible, objectionable sound shall be attenuated through the design and layout of the duct system. If required to control objectionable noise, sound attenuators shall be provided as specified in Section 15895A, AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

1.16.9.2 Moist Exhaust Ducts.

Exhaust ductwork serving high moisture areas such as the kitchen condensate, restrooms and laundry shall not be routed through unconditioned spaces and shall be sealed water tight and constructed of stainless steel or welded aluminum.

1.16.9.3 Duct Drainage

Outside air intake louvers, louvered penthouses and moist exhaust ducts specified above shall be ducted and shall have provisions to dispose of melted snow, wind-blown rain and condensate which enters through the louvers or condenses in the duct. The duct seams shall be sealed watertight by soldering, brazing or welding and a drain provided at the duct low point. The drain shall be routed to a floor drain in a non-finished area such as the mechanical room. Duct access doors shall be provided near the louvers and drains.

1.16.9.4 Fire Dampers.

Fire dampers shall be provided as required by NFPA 90A and 90B. The designer shall show, on the construction drawings, all fire dampers as required by NFPA 90A and 90B. The pressure loss resulting from a full open fire damper shall be included in the system calculations specified above.

1.16.9.5 Manual Balancing Dampers.

Manual balancing dampers shall be provided at all branch take-offs in duct systems to permit adequate opportunity for balancing the system. Balancing dampers shall be located within 300 mm of the main duct. Splitter type dampers or air deflectors which project out of the branch and into the main duct shall not be provided. The designer shall show, on the construction drawings, all balancing dampers. The pressure loss resulting from a full open balancing damper shall be included in the system calculations specified above.

1.16.9.6 Manual Zone Balancing Dampers.

Manual zone balancing dampers shall be provided on each zone's main duct at the multizone AHU. These dampers shall be located within the mechanical room and within 1 m vertically from the discharge of the AHU. The designer shall show, on the construction drawings, all balancing dampers. The

pressure loss resulting from a full open balancing damper shall be included in the system calculations specified above.

1.16.9.7 Louvers.

Fixed blade louvers shall be located where exhaust fans and relief dampers discharge from the building and where outside air is brought into the building. Motorized dampers shall be provided at all duct penetrations of the building envelope to prevent loss of energy. Relief louvers and dampers (both a motorized and a backdraft per louver) shall be provided as specified above.

1.16.9.8 Cold Air Diffusers.

When the leaving air temperature for the cooling coil is below the dew point temperature of the space, diffusers designed for diffusion of cold air below 10 degrees C shall be provided. The designer shall clearly indicate on the construction drawings which diffusers are required to be cold air diffusers.

1.17 HVAC Controls.

Design of the Direct Digital Controls (DDC) for the various HVAC systems shall be included as part of the system design. Direct Digital Controls shall be as specified in Section 15971, DIRECT DIGITAL HVAC CONTROL SYSTEMS. The designer shall use the same basic format (symbols, nomenclature and identifiers) as shown in TI 810-11 for Single Loop Digital Controls.

1.17.1 Permanent Maintenance Instrumentation

Provide sufficient instrumentation to aid maintenance personnel in balancing and/or troubleshooting mechanical systems. Instrumentation shall be provided in the media at each change in temperature and at all mixing points in air handling systems, at all discharges of air handlers, and at all return mains. Pressure gauges, thermometers, flow indicators, sight glasses, etc., shall be installed to be easily read from the adjacent floor. Separate pressure gauges shall be installed on both the suction end and discharge end of pumps. Provide an isolation valve on all pressure gauges. Thermometers shall have separable socket thermo-wells. Allow for the removal, repair, or cleaning of flow measuring devices without having to shut down the system. Provide a portable meter, with appropriate range, for each type of flow measuring device installed.

1.17.2 EMCS Connection .

The contractor shall generate all software and shall provide all hardware as required to connect the facility to the existing Fort Riley centralized Energy Monitoring and Control System (EMCS). The EMCS system at Fort Riley is a Johnson Controls metasys system utilizing metasys NCM LAN compatible 350's.

1.17.2.1 Power Outage Start-Up

Upon an electrical power outage, all air handling units, pumps, and other major mechanical equipment shall shut down and shall be restarted in a logical and efficient manner. Timing between starts and sequence of equipment starting upon restoration of electrical power shall be provided and programmed into the HVAC temperature control system, with programming

capable of being changed by the operating personnel.

1.17.2.2 Local Space Temperature Control

Control of local space temperature setpoints shall be under control of the ${\tt EMCS}$.

1.17.2.3 Freeze Protection

Standard type freeze stats shall not be provided. The equipment is protected from freezing by the glycol mixture of the heating and cooling fluids. The control systems shall send an alarm through the EMCS and shut down the equipment when an averaging type sensor reports the delivery of air at a freezing temperature from any system within the facility. The equipment shall be restartable at both the local control panel and by the EMCS. Low temperature averaging safety sensors shall be as specified for other averaging type sensors in the air stream and may or may not be required to preform another control function.

1.17.3 Construction Control Drawings.

As a minimum, the designer's construction control drawings shall include a system schematic (following the format and symbology contained in TI 810-11), the sequence of operation, a table of all digital and analog inputs and outputs (points), all control valve Cv's, and wiring diagrams for all motor starters. The above information shall be provided for each and every distinct mechanical system.

1.17.3.1 System Schematic.

The system schematic shall identify all system sensors, indicators, actuators, pressure switches, gages, etc, and all major mechanical components such as fans, filter banks, dampers, coils, and control valves. An indicator shall be shown and installed everywhere a sensor is shown and installed for troubleshooting purposes. Separate stem type thermometers shall be required at the inlet and outlet of all hot water coils, all chilled water coils, and all dry cooler coils.

1.17.3.2 Sequence of Operations.

The sequence of operation shall be completed by the designer and shall be as specified in Section 15971, DIRECT DIGITAL HVAC CONTROL SYSTEMS. The designer shall modify all setpoints in the sequence of operation as required to match the final design of the system.

1.17.3.3 Input and Output Table.

The table of all digital and analog inputs and outputs shall, at a minimum, include function, setpoint and any appropriate remarks.

1.17.3.4 Control Valve Cv Table.

The table of all control valve Cv's shall, at a minimum, include each control valve's unique identifier, function, type, range and minimum required Cv. The control valve Cv shown here shall be the Cv used in the hydronic pressure loss calculations specified above.

1.17.3.5 Wiring Diagrams.

The wiring diagrams shall, at a minimum, show the source of power; control transformers (as necessary) including primary and secondary voltages; grounding; overcurrent protection; overload protection; safety devices; and all control contacts and switches. The diagrams shall be coordinated with the requirements of Section 16415A, Electrical Work Interior. All control voltages shall not be more than 120 volts to ground. All three-phase motors over 0.75 kw shall be wired with phase failure relay in the motor starter.

1.17.4 Control Panels.

The DDC HVAC panel shall be located in the mechanical room.

1.17.5 Package Equipment.

Package equipment, such as boilers and chillers, shall be provided with standard manufacture's DDC controls for each individual piece of equipment.

1.17.5.1 Boilers.

Each boiler shall accept a start/stop signal from the HVAC control system and shall provide a unit failure signal to the HVAC control system.

1.17.5.2 Chillers.

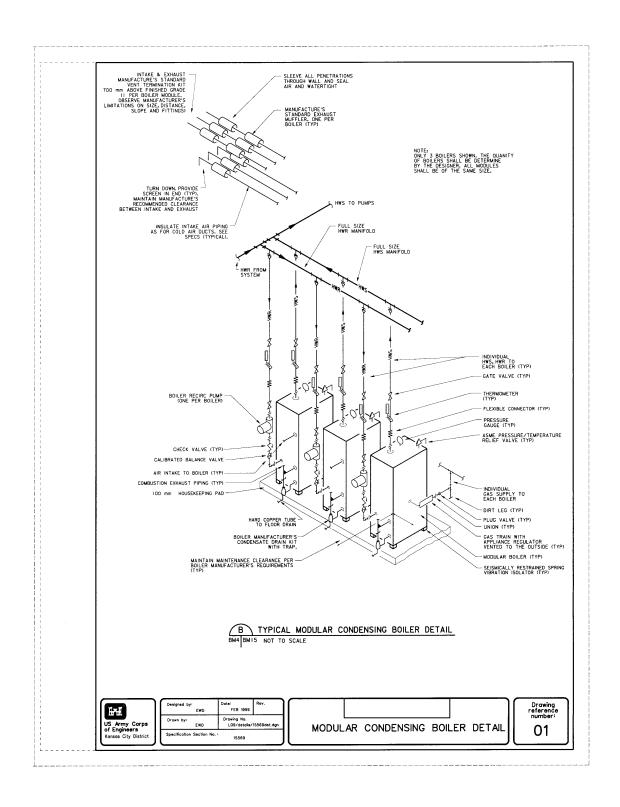
Each chiller shall accept a $0-to-10~\rm VDC$ or $4-20~\rm mA$ setpoint control signal from the HVAC control system. Each chiller shall provide a unit failure signal and a compressor run signal to the HVAC control system.

PART 2 NOT USED.

PART 3 NOT USED

-- End of Section --

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SECTION 01017

ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEES C2 (1997) National Electrical Safety Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2002) National Electrical Code (NEC)

NFPA 75 (1999) Standard for the Protection of Electronic Computer/Data Processing Equipment

NFPA 101 (2000) Safety to Life from Fire in Buildings and Structures

NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE)

NACE RP0169 (1992) Control of External Corrosion on Underground or Submerged Metallic Piping Systems

ILLUMINATING ENGINEERING SOCIETY (IES)

(2000) Illuminating Engineering Society Handbook

DEPARTMENT OF DEFENSE (DOD)

MIL HDBK 1008C (1997) Fire Protection for Design and Construction

INSTALLATION INFORMATION INFRASTRUCTURE ARCHITECTURE (13A)

I3A Installation Information Infrastructure Implementation Guide, Ver. 2

AMERICANS WITH DISABILITIES ACT (ADA)

ADA Americans with Disabilities Act--Accessibility Guidelines

UNITED STATES ARMY CORPS OF ENGINEERS (USACE)

Lighting Standards

(1997) Corps of Engineers Standard Lighting Fixture Details

Drawing Series No. 40-06-04, http://cadlib.wes.army.mil, CADD Details Library, Electrical Details, USACE Standard Details 40-06-04

Electrical Distribution Standards

Corps of Engineers Standard Electrical Distribution Details. http://cadlib.wes.army.mil, CADD Details Library, Electrical Details, Electrical Service and Distribution

UNITED STATES ARMY TECHNICAL MANUAL (TM)

TM 5-811-1 Electrical Power Supply and Distribution

TM 5-811-2 Electrical Design, Interior Electrical System

1.1 Standard Products

Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted.

1.2 Seismic Protection

Seismic Protection for electrical equipment shall be designed and installed in accordance with the requirements of Seismic Protection for Electrical Equipment Specification SECTION 16070.

1.3 COORDINATION OF ELECTRICAL CRITERIA

All electrical criteria provided in this section shall be coordinated with the architectural section, mechanical section, fire protection section, structural section, interior design section, civil and site section, and other sections as required. The number and location of all electrical equipment indicated in the electrical requirements are approximate. Contractors design shall meet the intent of the electrical requirements provided in this section. Contractor shall coordinate the final locations of all electrical equipment with the user.

1.4 EXTERIOR PRIMARY ELECTRICAL DISTRIBUTION SYSTEM

The primary electrical distribution system in this area is owned and operated by Ft. Riley Public Works. The Contractor shall install two 103mm conduits from the existing transformer at the Youth Activity Center. Extend 2-103mm concrete encased conduits to the transformer location for the new facility as indicated on site plan. Connect 15 kv primary cable from the existing "loop feed" type transformer to the new transformer. New elbows for loop feed shall incorporate connection of existing transformer surge arrestors.

1.5 EXTERIOR UNDERGROUND SECONDARY ELECTRICAL DISTRIBUTION REQUIREMENTS

Exterior secondary electrical distribution system to the Child Development Center shall be 480Y/277 volt, 3-phase, 4-wire underground feeder in conduit to a Main Distribution Panel (MDP) located in the electrical room. Main facility feeder and main distribution panel shall be sized to have a minimum of 25% spare capacity above the estimated maximum demand for the building. Design of the exterior secondary electrical system shall be in accordance with Electrical Distribution System, Underground - SECTION 16375 and the requirements of this section. The transformer shall be located a min. of 10 meters from the CDC. Sizing of secondary feeders and concrete encased conduit from the transformer to the facility main distribution panel will be the Contractors responsibility. One spare conduit shall be included in the secondary ductbank identical in size to the other conduits.

1.5.1 Exterior Underground Service Entrance Circuit

Service entrance conductors, branch and feeder circuits shall be single conductor Type USE in accordance with NFPA 70. All conductors shall be copper with insulated grounding conductor in conduit. Aluminum conductors and direct buried cables shall NOT be used.

1.5.2 Conduits

Conduits shall be single, round-bore type, with wall thickness and fittings suitable for the application. Both the primary and secondardy conduits shall be encased in 75 mm of concrete. Top of conduit shall be 610mm below finished grade.

1.6 EXTERIOR LIGHTING SYSTEM

Area lighting shall be provided for all parking lots, walkways, above all exit doors, and area signage. Lighting fixtures shall utilize high pressure sodium lamps. Pole/fixture heights shall be no greater than 9.15 meters above finished grade. Fixture/pole finish shall be round tapered brushed aluminum. The light poles should be designed to allow for 160 kilometers per hour wind speed. Design shall be in accordance with IES Handbook, Corps of Engineers Lighting Std. Det. Dwg. No. 40-06-04, Exterior Lighting Specification SECTION 16528, Electrical Distribution System, Underground Specification SECTION 16375 and the requirements in this section.

1.6.1 Area Lighting

Area lighting shall be provided for all areas noted above. Lux levels for the parking lot lighting shall be 6 lux minimum as measured on the pavement.

1.6.1.1 Walkway Lighting

Walkway lighting fixtures shall match the existing bollards in front of the Youth Activity Center. Walkway lighting bollards shall be placed along main walkway in front of the facility and sidewalks leading from each parking lot to both buildings. The existing bollards in front of the Youth Activity Building shall be left in place or reinstalled if required. Illumination level for new bollards shall be 6 lux along sidewalk. Walkway lighting shall be controlled as described below in lighting control.

1.6.1.2 Parking Lot Lighting

Parking lot lighting fixtures shall be cobra head type fixtures (Corp of Engineers Fixture Type EH2) with single arm or double arms as required mounted on a 9.15 meter tapered brushed aluminum pole. Lamps shall be high pressure sodium and sized to meet lighting criteria (Corp of Engineers Fixture Type EH2). Poles shall not be located within the parking lot areas. All lighting will be from the perimeter of the parking lot. Control for the parking lot lights will be as described below in lighting control.

1.6.1.3 Exterior Building Lighting

Exterior building lighting fixtures shall be Corps of Engineers Fixture Type EH5. Lamps shall be high pressure sodium and sized to provide 10 lux 3 meters from the building. Fixture(s) shall be mounted at each entrance to the building. Exterior building lighting fixtures shall be controlled as described below in lighting control.

1.6.1.4 New Exterior Signage Lighting

A new exterior sign will be installed in front of the Child Care Development Center. This sign will require a ground mounted flood light suitable for exterior use. The light fixture shall be installed in a concrete mow pad with 610mm of concrete on all sides of the fixture. The light will be connected to one of the existing exterior lighting circuits.

1.6.1.5 Existing Exterior Signage Lighting

The existing exterior signage for the Youth Activity Center will be relocated during this project. The existing fixture shall be reinstalled in a concrete mow pad with 610mm of concrete on all sides of the fixture. The light will be connected to one of the existing exterior lighting circuits.

1.6.2 Lighting Control

Provide disconnect switch with HAND-OFF-AUTOMATIC switch and lighting contactors for exterior lighting controls. Install lighting controls in the electrical room. Lighting shall be controlled by a combination of a photocell and astronomical timer when switched to the auto mode. Install lighting controls per requirements of this section. Exact location of all lighting controls shall be verified with the USER during design of the project.

1.6.3 Underground Lighting Circuits

Provide underground branch circuits for all exterior lighting circuits. Branch circuits shall be insulated copper conductors with insulated grounding conductor in conduit. Aluminum conductors are NOT acceptable. Direct buried conductors are NOT acceptable. All underground lighting conductors shall be in minimum 27mm Schedule 40 PVC conduit. Top of conduit shall be 610mm below finished grade.

1.6.3.1 Lighting Pole Grounding

All exterior lighting poles or bollards shall be grounded at the base of

the pole. Provide a 19 mm by 3050.0 mm copper clad grounding rod at each pole.

1.6.3.2 Conductors

Cables shall be type USE conforming to UL 854, with copper conductors and type RHW or XHHW insulation conforming to UL 44, and shall include green ground conductor. Cable shall be provided with insulation of a thickness not less than that given in TABLE 15.1 of UL 854. Cable shall be rated for 600 volts. Parts of the cable system such as splices and terminations shall be rated not less than 600 volts. Conductors larger than No. 8 AWG shall be stranded.

1.6.3.3 Conduits

Conduits shall be single, round-bore type, with wall thickness and fittings suitable for the application. Conduits shall be non-encased direct-burial, schedule 40 for lighting circuits.

1.6.4 Building Lighting Circuits

All exterior fixtures mounted on the surface of the building shall be wired from within the building and shall conform to the Interior Wiring Methods paragraph of this section. No building lighting circuits shall be surface mounted.

1.7 EXTERIOR COMMUNICATION DISTRIBUTION SYSTEM

This design shall be in accordance with the Telephone System, Outside Plant Specification SECTION 16711, Fiber Optic Outside Plant Specification SECTION 16713 and the requirements of this section.

1.7.1 Communications Overview

Both telephone and single mode fiber optic cable will be required for this facility. Both the telephone and fiber optic requirements are identified on sheet C10.1. Both the telephone cable and fiber cable will be spliced to existing trunk cables and routed in existing ductbank or direct buried to the site. Conduit and handholes for the direct buried portion of the cables are included as an option.

1.7.2 Telephone Distribution

Provide telephone cable as indicated on sheet C10.1. Terminate outside plant cable in BET with built in splice chamber. Use 25 pair modular splices in the splice chamber. Equipment shall be mounted on backboard in DOIM Communications Room.

1.7.3 LAN Distribution

Provide single mode, fiber optic cable as indicated on sheet C10.1. Cable shall be spliced to existing fiber cable in manhole. Cable shall be terminated in rack mounted fiber patch panel located in the DOIM Comm Room.

1.8 CATHODIC PROTECTION SYSTEM

A sacrificial anode cathodic protection system shall be provided for all underground metallic lines, fittings, valves and fire hydrants. In addition to the anodes, all metallic pipes must be provided with a coating system.

The systems shall be designed and installed in accordance with NACE RP 169 Standards. Criteria for determining the adequacy of protection shall be in accordance with NACE RP-01-69 and shall be selected by the corrosion engineer as applicable. Design shall be in accordance with Cathodic Protection System, (Sacrificial Anode) - Specification SECTION 13110 and the requirements of this section. Each anode shall be connected to the structure through a flush-to-grade test station with a concrete maintenance collar. At least one test station shall be provided on each valve, fire hydrant and metallic pipe.

1.9 UNDERGROUND CABLE MARKINGS

All underground cables and ductbank should be marked with utility marking tape with appropriate utililty type label name.

1.10 INTERIOR ELECTRICAL DISTRIBUTION SYSTEM

The interior secondary distribution voltage within the building shall be 480Y/277 volt, 3-phase, 4-wire. Conductors shall be copper. Aluminum conductors shall not be used. The voltage (480 volts 3 phase) shall be used for larger motor loads, equipment loads and all other required loads. The lower voltage (277 volts 1 phase) shall be used for all lighting loads. Provide step down transformers, 480V-208Y/120V, to be used for all receptacle, small motors, computer, and all other loads as required. Step down transformers shall have a 25% spare capacity for future loads. Design shall be in accordance with Electrical Work, Interior - Specification SECTION 16415 and the requirements of this section.

1.10.1 Service Equipment Main Distribution Panel (MDP)

Service equipment/disconnecting means shall be provided in the Main Distribution Panel (MDP) located in the electrical room. The MDP shall be a free standing switchboard if service is determined to be 800 amps or greater or a wall mounted panelboard if less than 800 amps. Service disconnect means shall be of the bolt-on circuit breaker type. MDP shall include transient voltage surge protection incorporated into the panel. Metering shall be include kwh meter, voltage meter, current meter, and shall be equipped with pulse initiatiors for connection to the base EMCS. The main breaker shall be solid state and the branch breakers shall be molded case. All breakers 225 amps and larger shall be adjustable trip.

1.10.2 Protective Coordination Study

A protective coordination study to include overcurrent and short circuit analysis shall be done on the electrical distribution system for the building if the building service transformer is 750 kva or larger. The study shall include the interior electrical distribution system back to the secondary side of the pad mounted transformer.

1.10.3 Panelboards

Lighting and appliance branch-circuit panelboards shall be of the bolt-on molded case circuit breaker type conforming to NEMA AB-1 and UL 489 and shall be located in the electrical room. Enclosures shall be general purpose wall mounted type. Busses for all panelboards shall be copper. Aluminium shall not be used. The maximum number of poles in an individual panelboard shall be 42 poles.

a. All panelboards shall have after construction, a minimum of 25

percent spare capacity for all loads. Panelboards shall have a minimum of 25 percent spare circuit breakers. Spare circuit breakers shall be redundant of the type of circuit breaker being provided in the panelboard.

b. Provide a separate panelboard to feed kitchen equipment. Panelboard shall have a main breaker that is shunt trip operated from two mushroom switches, one located at each exterior exit from the kitchen. Exhaust hood control panel shall also trip the main breaker of the kitchen panel during an exhaust hood fire. Kitchen lights shall not be fed from this panel.

1.10.4 Motors

Motors shall be of sufficient size for the duty to be performed and shall not exceed the full-loading rating when the driven equipment is operating at specified capacity under the most severe conditions encountered.

- a. All motors shall have open frames and continuous-duty classification and be based on a $40\text{-degree}\ \text{C}$ ambient temperature reference.
- b. All permanently wired polyphase motors of 747 watts or more shall meet the minimum full-load efficiencies as indicated in Section 16415: ELECTRICAL WORK, INTERIOR.
- c. Motors with power supplied from a variable frequency drive shall be a definite purpose inverter fed mothor in accordance with Part 31 NEMA MG-1.

1.10.5 General Purpose Receptacles

Duplex receptacles for general purpose applications shall be NEMA 5-20R, 20 amp, 125 volt, 2-pole, 3-wire grounding type. A maximum of five duplex receptacles may be connected to a receptacle circuit. Receptacle circuits shall not supply lighting loads and shall have dedicated neutrals. All receptacle circuits shall be 20 amps. General purpose duplex receptacles shall be located in the facility as follows:

- a. Provide general duplex receptacles every 3.5 meters along the walls in all areas of the building. For small rooms that do not have 3.5 meter walls, a minimum of one (1) outlet shall be installed on each wall. Circuits for activity room receptacles shall be calculated assuming that two receptacles in each room will be used for computers. All office receptacle circuits shall be calculated for one computer. The computer load used for circuits shall be 600 VA. General receptacle loads shall be calculated in accordance with the National Electrical Code. Receptacles shall be mounted 380mm above finished floor.
- b. Provide a general purpose duplex receptacle adjacent to sink in each bathroom. Receptacles shall have (GFI) ground fault interrupters.

1.10.6 Special Receptacles

Ground Fault Interrupter (GFI) receptacles shall be provided at all sink countertops, janitor's closet, kitchen, laundry, wet locations or any other location required by the National Electrical Code. Weatherproof receptacles for exterior use, shall be mounted in a box with a gasketed, weatherproof, cast-metal cover plate and gasketed cap over each receptacle

opening with (GFI). Exact location of the receptacles noted below shall be coordinated with the user during the design of this project. Provide NEMA 5-20R 20 amp,125 volt, 2-pole, 3-wire grounding type, duplex receptacles. Each receptacle shall be on a dedicated circuit(unless otherwise indicated) in the following locations and as indicated elsewhere in this proposal including sheets A8.1-A8.4.

- a. Provide duplex receptacles for microwave, coffee maker and full size refrigerator in the staff room. All appliances shall provided and installed by the government.
- b. Provide a duplex receptacle for each electric water cooler.
- c. Provide duplex receptacles for the government furnished and government installed copier and fax machine.
- d. Provide a duplex receptacle with ground fault interrupter on the exterior of the building adjacent to each exit door of the building. Mount receptacles 610mm above finished grade.
- e. Provide two (2) 20 A, quad outlets, each on a dedicated circuit in the DOIM COMM. Room. One should be mounted on the plywood backboard and the other mounted on LAN Rack.
- f. Provide four duplex outlets for counter-top office equipment, equally spaced under the counter with through-the-counter top grommets provided for cords. Outlets shall be NEMA 5-20R, 20A, 125 volt, duplex outlets with dedicated branch circuits. Receptacles shall be installed 305mm above the floor.
- g. Provide one (1) dedicated NEMA 5--20R, 20 amp, 125 volt duplex receptacle for EMCS and DCC panels.
- h. Provide one clock outlet in each office, training room, admin areas, activity room, multipurpose room (protected), staff area, kitchen and building lobby and three locatons in the atrium. Clock outlets shall be single, 15 amp, 125 volt, 2-pole, 3-wire grounding type receptacles. Outlets shall be mounted 2135mm AFF. All locations should be coordinated with the user.
- i. Provide 15 duplex receptacles for computer lab. A maximum of three duplex computer outlets shall be connected to a receptacle circuit. Circuits shall be sized using 600 volt-amp per computer. Seperate neutral conductors shall be provided with each circuit. Outlets shall be mounted adjacent to the Telephone/Data outlets. Maintain a separation of 160mm from the Telephone/Data outlets. Exact location of all Computer Outlets shall be verified and coordinated with the user during the design of the project.

1.10.7 Other Loads

Contractor shall provide electrical power to the following loads either by receptacle or direct wired as applicable:

a. Closed Circuit Television (CCTV): Provide 4 -20 amp duplex receptacles, each on a dedicated circuit. Two shall be for CCTV backboard and one for a CCTV equipment cabinet. This equipment will be located in the Clerk Station. The other circuit shall be for monitors in the Reception area.

- b. Intercom: Contractor shall provide power as required for Contractor provided and installed intercom system.
- c. Laundry Equipment: Contractor shall provide power receptacles as required for a washer and dryer in the Laundry Room.
- d. Kitchen Equipment: Contractor shall provide power receptacles and connections as required for kitchen equipment. A list of equipment is described in Section 11000. Any equipment with a load requirement greater than 750 VA shall be on a dedicated circuit. Receptacles and connections shall be rated NEMA 4, suitable for hosedown.
- e. Intrusion Detection: Provide 20 amp circuit for future intrusion detection control panels. Circuit should be located in DOIM communications room in designated space.

1.10.8 Architectural/Mechanical Connections

Contractor shall provide branch circuits, disconnect switches, magnetic starters, and all other related electrical equipment and material for all architectural, mechanical equipment and environmental equipment to be installed in the project (includes the facility and site). This shall include all HVAC units, unit heaters, pumps, exhaust fans, irrigation control panel and all other mechanical equipment in the facility. Disconnect switches shall be provided for all equipment that is not within site of the panel disconnecting means. All three phase motors shall have phase failure protectors. Designated sinks and toliets shall be controlled by passive infrared sensors hard wired to the building electrical distribution system. No batteries shall be allowed for this purpose. Night access through the main entrance door shall be restricted by the use of an electromagnetic door release actuated from the reception's desk. Contractor shall coordinate these electrical requirements with the architectural and mechanical requirements.

1.11 INTERIOR LIGHTING SYSTEM

The interior design shall be in accordance with the requirements in this section, the IES Handbook, the "Electrical Work, Interior" Specification - SECTION 16415, and the requirements in this section. Light fixture selection and color shall be coordinated with the Architect and Interior Designer. The USACE fixture number in the following table identifies the fixture type required for the room. All fixtures provided for this facility shall meet the requirements listed in the light fixture details. The details can be downloaded from the web site listed under Lighting Standards in the References section. Abbreviations for switching type are identified below the table.

1.11.1 Interior Lighting Requirements

Interior Lighting Requirements Table

	USACE		
ROOM	FIXTURE	SWITCHING	ILLUMINATION
NAME	NUMBER	TYPE	LEVEL REQUIRED
Vestibule 101,113	RF2	LS	320
Lobby 102	RF2	LS	210
Gathering Area 103	RF9	LS	320
Atriums 104,105,106	PF2	LS,****	210

Interior Lighting Requirements Table

	USACE		
ROOM	FIXTURE	SWITCHING	ILLUMINATION
NAME	NUMBER	TYPE	LEVEL REQUIRED
Reception Area 107	RF12	LS	540
Isolation Area 108	RF3	LS	540
Clerk Station 109	RF12	LS	540
Toilet 110,111	SF6,**	LS	210
Staff Lounge 112	RF9	LS	320
Training Room 114	RF12	LS	320
Assist Dir. Office 115	RF12	LS	320
Directors Office 116	RF12	LS	320
Kitchen 117	RF9	LS	540
Scullery 118	RF9	LS	540
Walk-In Freezer 119	Provided with	equipment	
Walk-In Refrig. 120	Provided with	equipment	
Dry Food Stor. 121	RF9	LS	320
Toilets 122,123	RF9,**	KLS	210
Janitor Closet 124	PF6	LS	210
DOIM Comm. 125	SF7	LS	540
Storage Room 126	PF6	LS	210
Laundry Room 127	RF9	LS	320
Mech Room 128	SF7	LS	210
Elect Room 129	SF7	LS	210
Storage Room 130	SF7	LS	210
Multipurpose Room 131	PH8***	KLS	320
Storage and Issue 132	PF6	LS	320
Toilet 133,134,140,141	RF9,**	KLS	210
Activity 135,136, 137,138,139,142	RF9	LS	320
Homework 143	RF12	LS	320
Computer Lab 144	RF12	LS	320
Comm 145	RF9	LS	540

LS 120 Volt Light Switch

KLS Keyed Light Switch

1.11.2 Task Lighting

Fluorescent task lighting shall be provided as indicated on sheets A8.1-A8.4. Fixtures shall meet the requirements for Corp Fixture Type FF1.

1.11.3 Conservation Requirements

Illumination levels, in conjunction with energy conservation, shall be obtained by the most life cycle cost-effective techniques including, but not limited to, the following:

- a. Provide occupancy sensors as indicated in the above table. Occupancy sensor shall meet the requirements listed in the light fixture details. The details can be downloaded from the web site listed as Lighting Standards under the References heading.
- b. Provide energy efficient lamps and solid-state electronic ballasts.

^{**} Wall mounted fluorescent mirror fixture in addition to RF9.

^{***} Provide 10% of fixtures with quartz restrike

^{****} Light switch for atrium shall be located in reception area

1.11.4 Fluorescent Fixtures

Fluorescent light fixtures with T8, 32 watt lamps shall be used in most areas of the building. Fixtures and light switches installed in the kitchen shall be suitable for a damp location. All fixtures with open reflectors shall be of the self locking type or have a shield installed to prevent fluorescent light tubes from falling out. All ballasts shall be of the energy saving electronic type with power factor exceeding 90%. Lamps shall be broad spectrum and provide a warm color. Lamps shall be high efficiency with a minimum of 90 lumens per watt (32W lamp), have a color rendition index of 75 and have a color temperature of 3500K.

1.11.5 Incandescent or Compact Fluorescent Lighting Fixtures

Incandescent or compact fluorescent lighting fixtures shall NOT be used.

1.11.6 Egress and Exit Lighting Fixtures

Egress and exit lighting design shall be in accordance with NFPA 101. Exit lights shall be green LED type XL1 - Corps of Engineers Lighting Standard. Det. Dwg. No. 40-06-04. Exit lighting shall flash upon initiation of the fire alarm system. Egress lighting shall be provided from room fluorescent light fixtures with an emergency battery and lamp supply unit installed. Typical through out the facility.

1.11.7 Wire Guards

Provide wire guards for all light fixtures in the multipurpose room, the mechancial room, the electrical room and janitors closets.

1.12 INTERIOR COMMUNICATION SYSTEM

1.12.1 General

The Contractor shall prewire the building for a voice/data Category 5e system. All telephone/data outlets shall be provided with duplex 8-position jacks (RJ45), one telephone and one data. Cable used shall be EIA/TIA Category 5e, UTP solid copper station wire. Wire shall be routed in a minimum 27mm conduit installed in the walls to the cable tray. Conduit should include a nylon pull string for adding additional cables in the future. Wire basket type tray shall be provided to route cables back to the DOIM Communications Room. Cable tray should also be used for routing CCTV and Intercom System cables. Cables for different systems shall be physically seperated by barriers. All communications circuits shall be continous and free of splices from communications room to outlet. Cable tray shall be sized in accordance with I3A standards. Conduit shall be used to bridge cable trays through fire rated walls. Ladder type cable racks shall be installed in DOIM Communications Room to route cables from cable tray to the communications rack and telephone backboard. Connect all telephone outlets to Type 110 cross connects mounted on telephone terminal backboard in the DOIM Communications Room. Data jacks shall be mounted to Category 5e Patch panels mounted in a free standing rack located in the DOIM Communications Room. Communications room layout shall conform to Figure 2-2 of I3A standard. All electronic devices (computers, file servers, hubs, concentrators, phones, etc.) are not part of this contract and will be installed by Ft Riley. Each facility design shall be in accordance with the Premises Distribution System Specification - SECTION

16710, Electrical Work, Interior Specification SECTION 16415 and the requirements of this section. Testing shall be done in accordance with TSB-67, EIA/TIA-568A as required in Premise Distribution System Specification Section 16710 with all test results provided to the DOIM.

1.12.2 Telephone Terminal Backboard

Provide a 19 mm plywood backboard on one long wall and the back wall of the DOIM Communications Room. Provide surge arrestors and 110 type cross connect blocks for the incoming telephone conductors. The plywood telephone backboards shall be provided with a fire retardant coating. Contractor shall coordinate location of incoming telephone service with the location of the surge arrestors and cross connect blocks on the telephone backboard. See Special Receptacle section for power requirements. All underground conduits entering the Communication Room shall be stubbed up 150 mm above finished floor adjacent to the telephone backboard. All stubbed conduits shall be sealed with polyurethande foam duct seal.

1.12.3 Telephone Conductors/Conduits

Copper cables shall be 24 gauge, 4 pair, EIA-TIA-568A Category-5e, unshielded twisted pair (UTP) solid copper station cable. Terminate cables on jacks with EIA 568A standard for wiring. All telephone/data conductors shall be installed in 27mm conduits with bushings per Wiring Methods paragraph in this section.

1.12.4 Telephone/Data/LAN Outlets

Telephone/data/LAN outlets shall consist of one telephone jack and one data jack. Telephone and data outlets shall be installed in the same junction box. Telephone jacks shall be used for voice communication and data jacks shall be used for data communication. Each outlet shall be mounted 380mm above finished floor. All jacks shall be terminated using the T 568B standard. Provide telephone/data outlets at each of the locations indicated in the following paragraphs:

1.12.5 Telephone/Data Outlets

The location of outlets shall be coordinated with the Architect and User to support furniture layouts.

- a. Provide two telephone/data outlets in each office. Outlets should be located on opposite walls.
- b. Provide two (2) telephone/data outlets on the wall behind the reception area.
- c. Provide two telephone/data outlets in training room. Outlets shall be located on opposite walls.
- d. Provide four telephone/data outlets in each activity room.
- e. Provide eight telephone/data outlets in the Multipurpose ${\tt Room}$ (4 on each side).

1.12.6 Telephone Single Outlets

Each single telephone outlet shall have one (1) telephone jack installed in a single junction box. Telephone single jacks shall be ivory in color.

Outlets shall be mounted at 1220mm above finished floor. Wall plates shall be suitable for mounting standard wall phones. Provide outlets at the following locations:

- a. Provide one (1) single telephone outlet in each activity room, the multipurpose room and the Kitchen.
- b. Provide one (1) single telephone outlet in each mechanical, electrical and communications room.

1.12.7 LAN Rack

Contractor shall provide a free-standing rack in the DOIM Communication Room. See special receptacle paragraph for power requirements.

1.13 CROSS CONNECT CABLES

Provide 25 pair #24 AWG telephone cables with 50 pin connectors at each patch panel and punch down the other end of the cable at the cross-connect blocks. Support all telephone cables by cable racks installed in the DOIM Communications Room.

1.14 RJ45 PATCH PANELS

Provide RJ 45 patch panels for all data circuits in the project. Patch panels shall include 20% spare for future expansion.

1.15 FIBER-OPTIC PATCH PANELS

Incoming fiber-optic cables shall be terminated in rack mounted patch panel suitable for ST type connectors.

1.16 COMMUNICATION GROUNDING

All exposed non-current carrying metallic parts of the telephone equipment, cable sheaths, cable spices and terminals shall be grounded. Contractor shall provide a Master Ground Bus (MGB) in the Communication Room per Premises Distribution System - Specification Section 16710.

1.17 INTERCOM SYSTEM

Provide an internal system which allows for individual room/area communication. The intent of such a system is for two way communication rather than general announcements or music. Locate system master panel at the reception desk with a slave panel located in the Directors office. Both the master and slave panels shall have the capability of zone selective or system wide distribution of announcements. System remotes shall be located in all activity rooms, homework center, computer lab, offices, staff areas, and kitchen. In addition provide speakers in the attrium areas. Remotes shall be mounted at 1375mm above finished floor or grade and each shall be hands free operation.

1.18 INTRUSION DETECTION SYSTEM

Provide two empty conduits from the front desk to the comm room. One needs to be located where an alarm could be connected to the cash drawer, this conduit would also be extended to a floor location for a protected toe switch. The second conduit would be from a wall location where the keypad

for the system would be located. Designate a wall in the communications room for future security panels. These are empty conduits with pull strings only.

1.18.1 Local Alarm

A local alarm will be included in this contract for all activity rooms that have exits to fenced areas. This alarm shall momentarily sound when the doorway is opened. The alarm can be either a chime or gong. In addition provide a double gang box and 27mm conduit from the door to the DOIM comm room. A maximum of three doors can be combined in one conduit.

1.18.2 Power and Communications for Future Alarms

Provide power and a empty communications conduit for the following doors:

- a. Double doors at multipurpose rooms
- b. All storage room exterior doors
- c. Both exterior kitchen doors
- d. The main entrance door

A maximum of three doors can be combined together on one circuit and three doors can be combined in the communication conduit back to the DOIM communications room. Power shall consist of providing a 20 amp circuit in a double gang box with a blank coverplate on the interior side of the door near the top hinge. The communications conduit shall consist of a double gang box with coverplate located near the power box with a minimum 27mm conduit with pull string back to the dedicated security panel space in the DOIM Comm room.

1.18.3 Door Bells

Provide comercial grade door bells at both the main enterance and the kitchen exterior door near the freezer. The chimes will sound locally in the reception area and kitchen respectively.

1.18.4 Delayed Egress Locks

Panic hardware with a 15 sec delayed egress lock shall be installed on the double door to vestibule 113. Doors shall unlock in the event of a fire alarm per NFPA 101.

1.19 CLOSED CIRCUIT TELEVISION SYSTEM

1.19.1 CCTV Camera Locations

Provide a complete CCTV raceway system. Contractor shall provide conduit, cable tray, j-boxes, wireways and outlet boxes as required to support the user furnished and installed CCTV system. Camera locations are shown on sheet E1.1. Communications cable tray can be used for this system. Portion of cable tray used for CCTV shall be separated by a barrier. In locations where a bank of three cameras are shown in a single location, One conduit and 117 mm square back box can be provided to serve all three cameras. Each camera shall will require a RG-59 and a 18/2 NTP cable. Conduit used for multiple cameras shall be sized accordingly. The minimum conduit size shall be 27mm. Mounting height for back boxes shall be as

follows:

a.

Room Type

Mounting Height 2440mm

Unfinished Space Multipurpose Room

3660mm

Outside Cameras

Under soffits

Finished space with drop ceilings Mount above ceiling

1.19.2 <Monitor Locations

b.

Provide two 102mm back boxes above ceilng in reception area with 27mm conduits back to Clerk Station. Exact location of monitor boxes shall be coordinated with the user during design.

1.19.3 Clerk Station Requirements

Conduit shall terminate at the power supply backboard located at the Clerk Station. All conduit ends shall be provided with bushings and labelled to identify rooms and equipment served. The clerk station will contain a $1220\text{mm}(w) \times 2440 \text{ mm}$ (h) backboard for CCTV power supplies and equipment. In addition space will be requried for a $1220 \, \text{mm}$ (w) x $710 \, \text{mm}$ (d) x $2130 \, \text{mm}$ (h) government provided free standing cabinet adjacent to the backboard. CCTV support equipment locations shall be verified and coordinated during the design of the project.

CABLE TELEVISION 1.20

Provide a 21mm conduit w/pullwire, outlet box and cover plate from the staff lounge area to the above ceiling mounted cable tray. Coordinate outlet box location with the user. In the Communications Room provide a dedicated wall space, 915mm X 915mm backboard for cable television. Cable and connection will be by Others.

1.21 ENERGY MONITORING AND CONTROL SYSTEM (EMCS)

Provide power as required for all EMCS or DDC components (such as dampers, VAV boxes, control panels, etc.) requiring power. The EMCS software and hardware shall be modfied to incorporate the building into the system.

1.22 WIRING METHODS

Wiring shall conform to NFPA 70, Section 16415: ELECTRICAL WORK, INTERIOR, and the requirements of this section.

1,22,1 Power Conductors

Conductors shall be copper only. Aluminum conductors are not allowed. Minimum conductor size shall be #12 A.W.G. Conductors shall be installed in conduits. Power and lighting conductors shall be 600 volt, Type THHN (in dry locations), and THW or THWN (in wet locations).

1.22.2 Communication Conductors

Communication conductors shall be provided per paragraph Telephone Conductors of this section and Premises Distribution System, Specification Section 16710.

1.22.3 Conduits

Wiring shall consist of insulated conductors installed in rigid aluminum conduit, rigid zinc-coated steel conduit, electrical metallic tubing, electrical intermediate metal conduit or rigid nonmetallic conduit. Plastic conduit, when used, shall be in accordance with Article 347 of the NEC. Raceways shall be concealed within finished walls, ceilings, and floors.

1.23 GROUNDING SYSTEM

The grounding system shall be designed in accordance with NEC Article 250 and the following criteria. In general, all metallic building components including reinforcing steel and miscellaneous metals shall be part of an electrically continuous ground system. Steel studs used in interior wall construction, T bars of the ceiling grid, diffusers of the air distribution system, and door hardware are exempt from this bonding requirement. Bonding shall be by exothermic welding or the brazing of a copper wire between components. Design shall be in accordance with Electrical Work, Interior Specification - SECTION 16415 and this section.

1.23.1 Communication Grounding System

Grounding for the main telephone service shall be provided by installing an insulated #6 copper grounding conductor in 27mm conduit from the Master Grounding Bus (located in the DOIM Communication Room) to the building service ground.

1.23.2 Grounding Conductors

A green equipment grounding conductor, sized in accordance with NFPA 70 shall be provided, regardless of the type of conduit. Equipment grounding bars shall be provided in all panelboards. The equipment grounding conductors shall be carried back to the service entrance grounding connection or separately derived grounding connection. Grounding conductors shall be provided in all branch (including lighting circuits) and feeder circuits.

1.24 FIRE DETECTION AND ALARM SYSTEM

Design shall be in accordance with Section 13851: FIRE DETECTION AND ALARM, ADDRESSABLE, and the requirements of Section 01018: FIRE PROTECTION.

1.25 TESTING

Contractor shall provide all testing required by all specifications listed in Divison 16. No testing requirements can be deleted from the master specifications.

- PART 2 PRODUCTS (Not Applicable)
- PART 3 EXECUTION (Not Applicable)
 - -- End of Section --

SECTION 01018

FIRE PROTECTION REQUIREMENTS

PART 1 FIRE PROTECTION REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 13

(1999) Installation of Sprinkler Systems

1.2 GENERAL PARAMETERS

All military construction must comply with the requirements of Military Handbook 1008C. This states that the type of construction and building area requirements are to be determined from the Uniform Building Code (UBC). All other requirements for separation, exiting, fire suppression, detection and alarms are to be determined from NFPA codes.

Fire protection shall be based on sound fire protection engineering principles that gives safeguards against loss of life and property by fire, consistent with the mission, risk involved, and economical utilization.

All applicable requirements of the aforementioned codes shall be incorporated into the design. Life Safety Code, NFPA 101 relative to this design shall give special attention to the application of fire codes as they relate to Life Safety. Features of fire protection based on the following shall be included in the design: automatic operating devices; exiting for inhabitants and the protection of egress components; personnel safety in hazardous areas; appropriate ratings of partitions, doors and windows; travel distances; common paths of travel; occupancy types; hazard of occupancies and their contents; isolation from the remainder of the facility; etc.

1.2.1 Types of Occupancies and List of Hazardous Areas/Essential Equipment

1.2.1.1 Occupancy Classification

This project consists of one building. The building is a combination of Day Care, Assembly, business and storage Occupancy in accordance with NFPA 101. According to the Uniform Building Code (UBC), the building shall be classified as "Group E, Division 3"and Group A Division 3 occupancy in accordance with Chapter 3, Table No. 3A.

1.2.1.2 Classification of Hazard of Contents

The classification of hazard of contents shall be determined by each portion of the building.

1.2.2 Separation of Structure

1.2.2.1 Exposure Classification

The building construction shall be a one-story structure. The types of non-combustible roof construction options available for each facility shall be determined by the Proposer.

1.2.2.2 Separation Distance in Feet

UBC, Table 5-A requires a separation of 1.5 meters, unless the exterior wall has a two-hour rating.

1.2.3 Fire Fighting Support

The main fire suppression shall be supplied by an automatic wet pipe sprinkler system. This fire protection and suppression system shall be tied into the building's fire detection and alarm system. The building shall be provided with fire extinguisher cabinets. The fire extinguisher cabinets shall be of the fully recessed type in all finished areas.

A fire alarm system in accordance with NFPA-72 shall be provided that covers the various parts of the building, monitoring of the sprinkler system, air handling units, etc..

See subsequent paragraphs of this Fire Protection section for additional information regarding fire suppression, detection, and other aspects of fire fighting support. Fire extinguishers are to be Contractor furnished/Contractor installed.

1.3 FUNCTIONAL AND TECHNICAL REQUIREMENTS

1.3.1 Construction for Fire Resistances of the Building Including Roofs, Walls, and Doors.

1.3.1.1 Building Construction Type

The building structure shall be a minimum Type II-N in accordance with UBC, Table No. 6-A. Type V, wood frame construction is not permitted by the user.

1.3.1.2 Exterior Walls

Exterior walls of the facilities shall not be rated as long as minimum distances from other buildings are maintained.

1.3.1.3 Roof

The building roof covering shall be Factory Mutual Approved or classified by Underwriter's Laboratory as Class A, roof system.

1.3.1.4 Interior Walls

Fire separation of various occupancies shall be provided per NFPA 101. All penetrations in fire rated walls (conduits, pipes, cable trays...etc.) shall be firestopped according to their respective wall/floor/ceiling rating at each penetration.

1.3.2 Type of Occupancies, Occupant Loads, Exits, and Travel Distances to Exits

1.3.2.1 Occupant Load

For purposes of determining required exits, the occupant load shall be based upon the actual maximum number of persons intended to occupy the space but not less than that required by NFPA 101. The multipurpose room is an assembly occupancy with occupancy of 1 person per 15 square feet (1.39 square meters)

1.3.2.2 Means of Egress

Not less than two exits shall be accessible from every part of the facility.

1.3.2.3 Travel Distance to Exits

Allowable travel distance limits to exits shall be per NFPA 101, Chapter 30.

1.3.3 Resistance to Interior Finishes and Materials to Flame Spread and Smoke Development

1.3.3.1 Interior Finishes

Interior finish materials on walls, ceilings, and partitions in all exits shall be Class A as defined in the Uniform building Code (UBC) and Mil. HdBk 1008C Section 2.7. All other areas shall have Class A or B interior finish materials for walls, ceilings, and furnishings. Smoke Developed Ratings shall not exceed 50 for Class A materials and 100 for Class B materials when tested in accordance with ASTM E-84.

1.3.3.2 Cellular Plastics

Cellular Plastics shall not be used as interior wall and ceiling materials per Mil HdBk. 1008C, Section 2.7.

1.3.3.3 Floor Finishes

Floor finishes shall be Class I or Class II. Carpet and other floor finishes shall have passed the acceptable criteria of American Society for Testing and Materials (ASTM) standard 84 or equivalent.

1.3.4 Fire Extinguisher Cabinets

Fire extinguisher cabinets shall be provided per NFPA 10 with a travel distance between fire extinguisher cabinets not to exceed 23 meters. Fire extinguisher cabinets shall be fully-recessed in finished areas, such as administrative, corridors, etc.. Ten pound ABC rated Fire extinguishers shall be supplied as part of this contract.

1.3.5 Stand Pipe

A fire department standpipe connection shall be provided in accordance with NFPA in the atrium at the janitor's closet wall. The fire department hookup shall be located near the front entrance.

1.3.6 Sprinkler Systems

Wet pipe sprinkler system shall be provided in all areas of the building. The sprinkler system shall provide fire sprinkler protection for the entire building. The wet pipe sprinkler system, as specified in Section 13930A, Wet Pipe Sprinkler System, Fire Protection, shall be provided for 100%

coverage. Except as modified herein, the system shall be designed and installed in accordance with NFPA 13 and Military handbook 1008C. Where any conflicts exist between MIL HNBK 1008C and other criteria, the requirement in MIL HNBK 1008C shall be meet. Pipe sizes shall be shown on drawings and shall be determined by hydraulic calculation. The design of the sprinkler system shall be based on hydraulic calculations, and the other provisions specified herein. The Fire Protection Engineer shall fully investigate the water supply, including all modifications made to the distribution system as part of this contract to determine the requirements for fire protection system as required by MIL HNBK 1008C.

1.3.7 Fire Protection Engineer.

The sprinkler and fire alarm system shall be designed by a qualified fire protection engineer as defined in MIL HNBK 1008C. Work specified in Section 13930A, WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION shall be performed under the supervision of and certified by the Fire Protection Specialist. The Fire Protection Specialist shall be an individual who is a registered professional engineer and a Full Member of the Society of Fire Protection Engineers. The Fire Protection Specialist shall be regularly engaged in the design and installation of the type and complexity of system specified in the Contract documents, and shall have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

1.3.8 Hazard Classifications.

The area hazard classifications shall be as classified in accordance with NFPA 13.

1.3.9 Design Area.

The design area shall be 278.7 $\mbox{m2}$ in accordance with MIL HNBK 1008C.

1.3.10 Hydraulic Calculations.

Hydraulic calculations shall be in accordance with the Area/Density Method of NFPA 13 except that calculations shall be performed by computer using software intended specifically for fire protection system design using the design data shown on the drawings. Hydraulic calculations shall be based upon the Hazen-Williams formula with a "C" value of 120 for steel piping, 150 for copper tubing, 140 for new cement-lined ductile-iron piping, and 100 for existing underground piping. Software that uses k-factors for typical branch lines is not acceptable. Calculations shall be based on the water supply data verified by the designer. Calculations shall substantiate that the design area used in the calculations is the most demanding hydraulically. Water supply curves and system requirements shall be plotted on semi-logarithmic graph paper so as to present a summary of the complete hydraulic calculation. A summary sheet listing sprinklers in the design area and their respective hydraulic reference points, elevations, actual discharge pressures and actual flows shall be provided. Elevations of hydraulic reference points (nodes) shall be indicated. Documentation shall identify each pipe individually and the nodes connected thereto. The diameter, length, flow, velocity, friction loss, number and type fittings, total friction loss in the pipe, equivalent pipe length and Hazen-Williams coefficient shall be indicated for each pipe. For gridded systems, calculations shall show peaking of demand area friction loss to verify that the hydraulically most demanding area is being used. Also for gridded systems, a flow diagram indicating the quantity and direction of

flows shall be included. The minimum pipe size for branch lines in gridded systems shall be 32 mm . Water velocity in the piping shall not exceed 6 m/s . A drawing showing hydraulic reference points (nodes) and pipe designations used in the calculations shall be included and shall be independent of shop drawings.

1.3.11 Hose Demand

An allowance for exterior hose streams of 1892 L/min shall be added to the sprinkler system demand at the point of connection to the existing system. An allowance for interior hose stations of 1892 L/min shall also be added to the sprinkler system demand.

1.3.12 Fire Flows Data.

The fire protection engineer shall perform fire flow test to determine the actual static pressure, residual pressure and flow at the finished site. The actual system installed shall be based on these final results for the finished site. Fire flows data for the CDC site is as follows:

1.3.12.1 Hydrant 5569

Hydrant 5569 has a flow rate of 2,431 GPM with a static head of 64 psi and a residual head of 20 psi.

1.3.12.2 Hydrant 5801

Hydrant 5801 has a flow rate of 2,106 GPM with a static head of 67 psi and a residual head of 17 psi.

1.3.12.3 Sprinkler Spacing

Sprinklers shall be uniformly spaced on branch lines. Maximum spacing per sprinkler shall not exceed limits specified in NFPA 13 for each individual hazard occupancy.

1.3.13 Fire Department Connections and Fire Hydrants

Fire Department connections for the sprinkler system(s) shall be provided with suitable all weather access for pumper apparatus within 46 meters, reference Mil Handbook 1008C, Section 2.11.1. A minimum of one fire hydrant shall be located within 46 meters of the fire department connections, reference Mil Handbook 1008C, Section 5.7.3.2 (a).

1.3.14 HVAC System.

All HVAC systems shall be designed in accordance with NFPA 90A for fire dampers, smoke dampers and fan shutdown. The designer shall show on the construction drawings all fire or smoke dampers required by NFPA.

1.3.15 Fire Alarm and Detection System

The system shall be designed in accordance with Mil Hndbk 1008C, NFPA 72 and NFPA 101. This system shall meet all the requirements of Chapter 16 of NFPA 101 for New Daycare Facilities. Supervisory initiating devices shall be provided and designed in accordance with NFPA 13 and 72. Placement of audio/visual devices shall comply with the Americans with Disabilities Act (ADA) and NFPA 72. Use the most stringent requirements from ADA or NFPA 72 where conflicts occur. Outside electric bell for sprinkler system(s) shall

also be provided with a visual strobe. The facility shall be provided with a main control panel. A local annuciator is also required in the vestibule of the facility. Design shall be in accordance with Fire Detection and Alarm Specification, Addressable - SECTION 13851. Fire alarm system shall be addressable to each device. The system shall use Style 6, SLC and Style Z NAC. Alarms shall be transmitted back to the Post Fire Station via a Mononco D-700 Transciever.

1.3.15.1 Main Control Panel

The Main Fire Alarm control panel shall be located in the DOIM Communications Room. The panel shall be equipped with a labeled switch which will shut down the entire HVAC system upon activiaton. Fire alarm system alarms, supervisory signals and trouble conditions shall be as follows:

- a. Alarms
 - 1. Manual Pull Station
 - 2. Duct Smoke Detector
 - 3. Waterflow Indicator
 - 4. Smoke Detector
- b. Supervisory Signals
 - 1. Valve Supervisory Switches
 - 2. Control Components
 - 3. Transceiver Door Tamper Switch
- c. Trouble Conditions
 - 1. Low Battery Voltage
 - 2. Circuit Fault
 - 3. Supervised Component Failure
 - 4. Power Failure

1.3.15.2 Annunciator Panel

A flush mounted annunciator panel shall be located in the vestibule of the building. The panel shall be a 1:200 metric floor plan of the building with names and room numbers indicated. The building will be seperated into zones. Each zone shall have two red alarm lights. One light will be labeled initiating device and the other labeled water flow. A yellow trouble and blue supervisory light shall be included for each zone.

1.3.15.3 Monaco Transceiver

A Monaco D-700 transceiver shall be provided that transmits information to the base fire department. The transmitter shall be size for the following zones:

- a. Alarm by initiating device
- b. Supervisory Alarm
- c. Trouble Alarm
- d. Sprinkler Water Flow
- e. Alarm Panel and Transceiver Door Tamper Switches
- f. Two Spare Zones

1.3.15.4 NFPA 13 and NFPA 72 Requirements

Provide control modules, smoke detectors, OS&Y tamper switches and water flow switches as required by NFPA 13 and NFPA 72. The requirements for smoke and heat detectors shall be as required by NFPA 101. All signaling line circuits shall be Style 6.

1.3.15.5 Other Requirements

- A. Provide duct detectors, manual pull stations, flow switches, tamper switches, notifications appliances, etc.. The notification appliances shall be with flashing strobe.
- B. Provide programable device and required cables for connecting to the system.
- C. Provide all software and a backup copy of all programming code for the system.

1.3.15.6 Alarm Verification

The system shall be provided with alarm verification features. The alarm verification features shall reduce false alarms due to transient conditions. The alarm/activation delay shall be adjustable from 0 to 60 seconds.

1.3.15.7 Indicating Devices

Evacuation indicating signalling devices shall be provided and designed in accordance with NFPA 101. Indicating devices shall be Style Z as defined by NFPA 72. Evacuation alarms shall be activated by any action described above under the alarm heading. Indicating devices shall be chimes with strobe lights.

1.3.15.8 System Design

The fire detection system shall be designed with the criteria specified in paragraph SYSTEM DESIGN of technical specification SECTION 13851, FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE, and with the criteria specified SECTION 01017 ELECTRICAL REQUIREMENTS.

1.4 DESIGN OBJECTIVES AND PROVISIONS

1.4.1 Zoning and Treatment of Each Potential Hazard

1.4.1.1 Fire Alarms and Extinguishing Systems

The facilities shall be provided with a fire suppression system and a detection system as indicated previously.

1.4.1.2 Egress Locations

Egress locations shall be marked with exit signs per Section 01017. (LSC).

1.4.2 Required Fire Exits

Required fire exits from the building shall lead to a public way or to a clear safe area at a minimum distance of 23 meters from the building.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION 01019

35 PERCENT DESIGN REQUIREMENTS

PART 1 35 PERCENT DESIGN SUBMITTALS

For general submittal requirements, See Section 01331 SUBMITTALS FOR DESIGN.

The 35 PERCENT design submittal consist of a design analysis, calculations, and drawings, and specifications as described in this section. This section contains the requirements for both a standard 35% submittal and additional requirements for a fast track submittal.

1.1 SITE PLANNING

1.1.1 Drawings

1.1.1.1 Location Plan and Vicinity Map

The Location Plan and Vicinity Map provided in the Request For Proposal (RFP) shall be updated as necessary and included in the drawings. The Location Plan shall include the Contractor's Access Route, Staging Area, and the Project Site.

1.1.1.2 Construction Phasing

The construction phasing plan will show how the Contractor will maintain access to the existing Youth Services Center (6:00 A.M. to 6:00 P.M. Monday thru Friday) for the duration of the contract. At all times access to parking for both the staff and customers shall be provided. In addition access for bus drop off in front of the existing facility shall be available. Phasing plan shall include any signage, temporary access drives, or temporary parking needed.

If the Contractor intends to $\underline{fast\ track}$ a final and complete phasing plan shall be provided as part of this submittal. Phasing shall be approved by the Contracting Officer prior to beginning of construction.

1.1.1.3 Removal Plan

The removal plan will show the existing physical features and condition of the site before construction. Each physical feature to be removed shall be hatched as indicated on the standard legend sheet, a legend on the removal plan, and properly noted: to be removed, to remain, or to be relocated. The Removal Plan shall be prepared at the same drawing scale and use the sheet boundaries as the Site Plan.

1.1.1.4 Site Plan

The Site Plan shall show all the site layout information necessary to field locate the building, parking lots, roads, sidewalks, and all other appurtenances to be constructed as part of the project. All major site work to be constructed will be dimensioned for size and location. The Site Plan will identify all site-related items such as: curbs, pavements, walks, bollards, trash enclosures, chiller units, electrical transformers locations, etc. in accordance with a standard legend sheet or with additional legends or notes. Drawing scales of between 1:250, 1:300, and

1:400 are acceptable scales for the Site Plan.

The Contractor shall provide a preliminary layout of the playground area at a scale of 1:50. The layout shall include dimensioning of each play area, all proposed playground equipment to be used, and type of playground surfaces.

The contractor shall provide a layout for the area designated as architectural paving (price option). This area is between the new and existing facilities and is located on the drawings provided with the RFP package. The basic contract will include concrete sidewalk in this location. In addition to the layouts the contractor will present details and manufacturer information on the proposed alternatives. Prior to proceeding to 60% the contractor will receive the users approval of the selected alternative.

The contractor shall consider the project's construction area, drawing legibility, number of sheets required in choosing the drawing scale. The Site Plan, prior to adding the dimensions and notes, should serve as the base sheet to other Plans, such as: Utilities Plan, Grading and Drainage Plans and Landscape Plan. Existing and proposed contours or utility lines shall not be shown on Site Plan. Physical features that will remain after the proposed construction has been completed shall be shown. This plan, or the Location Plan, will also show any free zones, construction limits, etc. Whenever the Site Plan occupies more than one sheet of drawings, a Key Plan shall be included. Additional plans showing specific areas of the site in smaller scales can be included if more detail is necessary.

Site Plan shall be accepted prior to 60% design.

1.1.2 Specifications

Provide a listing by title and number of all Technical Specifications proposed for use in the site design.

1.1.3 Design Analysis Narrative

Design analysis shall include the following:

1.1.3.1 Design References

Design references used in preparing the site design.

1.1.3.2 Basis, Specific Goals, Objectives and Priorities For Site Design

The Design Analysis should give the basis, specific goals, objectives and priorities for site design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Document pollution prevention measures and other environmental considerations made during design. The 35 percent Design Analysis must be approved and accepted before 60% Design.

1.2 CIVIL

1.2.1 Drawings

1.2.1.1 Grading and Drainage Plan

A preliminary grading and drainage plan showing the proposed layout of all

new culverts and roof drains shall be provided at the same scale as the site plan. Include layout for subdrains to be constructed for under drainage of the synthetic safety surfaces. Existing grading contours shall be indicated at 0.20 meter contour intervals. Tentative new grading contours shall be shown. Indicate proposed finished floor elevation of the new building. Provide location and description of benchmarks and indicate vertical and horizontal datums.

1.2.1.2 Grading and Plan (Fast Tracking)

The follwoing shall be submitted if the contractor intends to <u>Fast Track</u> the Construction:

A final grading and drainage plan shall be provided at the same scale as the site plan. New and existing grading contours shall be indicated at 0.25 m contour intervals. Indicate the finished floor elevation of all new buildings. Plans shall show the layout of the new and existing storm drainage and roof drainage systems. Uniform grades shall be labeled using slope arrows. Provide spot elevations at building corners, parking area corners, changes in grade, etc. Storm drainage lines and structures shall be labeled. The rim elevation of all manholes, curb inlets, and area inlets shall be indicated.

1.2.1.3 Grading Sections (Fast Tracking)

Provide as a minimum two grading sections (one east-west and the other north-south through the area of new grading work. These grading sections shall show new vs. existing grades, slopes of finished grades, finish floor elevations in the new building, and identification of main features such as parking areas, building, and walks.

1.2.1.4 Roof Drain and Culvert Profiles (Fast Tracking)

Provide profiles of all new culverts showing new and existing grades, new and existing utilities, pavement sections in detail, pipe diameters and lengths, pipe slopes, invert elevations, etc. Class and gauge of all culvert pipes shall be provided. This information may also be included in a Storm Drain Schedule drawing. Profiles of roof drain runout lines may or may not be provided, at the Contractor's discretion. However, invert elevations, lengths and pipe diameters of these roof drains shall be called out on the drawings.

1.2.1.5 Drainage Structure Details (Fast Tracking)

Provide typical details of all storm drainage structures.

1.2.1.6 Pavement Details

Provide details of concrete curb and gutter, integral curb, typical pavement sections, typical sidewalk section, pavement utility cut details, and interface detail between new and existing pavement.

1.2.1.7 Erosion Control Details (Fast Tracking)

Provide details of best management practices used to control erosion.

1.2.2 Specifications

Provide complete edited specifications for all items to be fast tracked.

Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

If the contractor does not intend to fast track then a list of specifications shall be provided which are intended for final design.

1.2.3 Design Analysis Narrative

Design analysis shall include the following:

1.2.3.1 References

Design references used in preparing the civil design.

1.2.3.2 Grading

A narrative of the grading design and criteria used.

1.2.3.3 Drainage

A narrative of the drainage design and criteria used. Include information on the storm drain pipe materials selected and their ability to withstand earth dead loads and live loads that will be imposed.

1.2.3.4 Storm Drainage System Calculations (Provide if Fast Tracking)

Storm Drainage System Calculations shall include the following:

- a. Drainage area map showing boundaries of each drainage area and respective drain inlet or culvert.
 - b. Storm run-off calculations for each drainage area.
- c. Tabulation of capacities of new storm drains including: diameter and slope of storm drain pipes, design storm discharge and velocity for each storm drain pipe, maximum discharge capacity of each storm drain pipe, headwater depth of each culvert during design storm discharge.

1.2.5 Storm Water Pollution Prevention Plan (SWPPP) (Fast Tracking)

See Section 01355, Environmental Protection, paragraph 1.7.2e and Section: 01356A, Storm Water Pollution Prevention Measures.

1.2.6 Basis, Specific Goals, Objectives and Priorities For Civil Design

The Design Analysis should give the basis for the civil design and should establish specific goals, objectives and priorities for civil design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Document pollution prevention measures and other environmental considerations made during design. The 35 percent Design Analysis must be approved and accepted before proceeding to 60% design.

1.3 GEOTECHNICAL

See Civil and Structural Design Requirement

1.4 WATER SUPPLY AND WASTEWATER

1.4.1 Drawings

1.4.1.1 Water Distribution and Sewage Collection Systems Plans (including building services)

Provide all existing utilities and above ground features, including sizes and material types, which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Indicate existing pipe material and sizes where new lines connect along with the type of connection and elevations of connections. Provide all new water and sewer lines with sizes. This will include all new service lines, up to within the 1.5 meter building line. Locations of all new manholes, fire hydrants, valves (including PIV's), similar appurtenances, and connection points shall be provided. Show contours on plan view. Include stationing on both plan and profile sheets.

1.4.1.2 Water Distribution and Sewage Collection Systems Profiles (\underline{Fast} Tracking)

Profiles of all gravity sewers and waterlines shall be provided. Profiles may be omitted for short waterlines, unless necessary to assure adequate cover or avoid interference with other underground facilities. Indicate existing pipe material and sizes where new lines connect. Indicate type of connection and elevation. Include all interference elevations.

1.4.1.3 Water Distribution and Sewage Collection Systems Details $\underline{\text{(Fast Tracking)}}$

Appropriate water and sewer details shall be provided. The standard detail sheets will be furnished if required. For roadway pavement crossings, indicate installation method (open cut, boring, jacking, trenchless excavation, etc.). Include standard casing details. Provide all existing utilities and above ground features which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Exclude siting notes and dimensions from the plan. Provide all proposed new water and sewer lines with preliminary sizes. This shall include all new service lines up to the 1.5 meter building line. Show the proposed locations of all new manholes, fire hydrants, valves (including PIV's), and connection points.

1.4.2 Specifications

Provide complete edited specifications for all items to be <u>fast tracked</u>. Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

Specifications shall be coordinated with the plans and include all items. Provide special sections to cover those subjects for which no UFGS guide specifications are used or available. All UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added.

If fast tracking is not intended the contractor shall submit a list of

specifications intended for final design.

1.4.3 Design Analysis Narrative

Design analysis shall include the following:

1.4.3.1 References

Provide design references used in preparing the water and wastewater design.

1.4.3.2 Water Supply and Distribution Systems

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the fire flow required and the available flow and residual pressures. A description of the water distribution system, a listing of allowable piping materials, hydrant flow test data and preliminary calculations necessary to support equipment, piping sizes, fire and domestic demands, etc., shall be provided.

The following shall be submitted if the contractor is <u>fast tracking</u> the construction:

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the fire flow required and the available flow and residual pressures. A description of the water distribution system, athe piping materials to be constructed, hydrant flow test data and Final calculations necessary to support equipment, piping sizes, fire and domestic demands, etc., shall be provided.

1.4.3.3 Wastewater and Sewers

Based on existing information the sanitary sewer system in the vicinity of the proposed facility is assumed to be adequate to carry the flows expected to be generated by the new facility. A narrative of the wastewater supply design and applicable criteria used shall be provided. Include the preliminary calculations used to design the average and peak contributing flows. Field verify the available capacity and full flow capacity of the existing system to ensure that it will be adequate for the flows generated by the new facility. Include the available capacity and full flow capacity in the design analysis. Preliminary calculations necessary to support equipment and piping sizes and a listing of allowable piping materials shall be provided.

The following shall be submitted if the contractor is <u>fast tracking</u> the construction:

Based on existing information the sanitary sewer system in the vicinity of the proposed facility is assumed to be adequate to carry the flows expected to be generated by the new facility. A narrative of the wastewater supply design and applicable criteria used shall be provided. Include the final calculations used to design the average and peak contributing flows. Field verify the available capacity and full flow capacity of the existing system to ensure that it will be adequate for the flows generated by the new facility. Include the available capacity and full flow capacity in the design analysis. Final calculations necessary to support equipment and piping sizes and a listing of piping materials to be constructed.

1.5 Exterior Mechanical Distribution System

1.5.1 Design Analysis Narrative

The design analysis shall contain a narrative description and analysis of the exterior distribution system design. The basis and reasons for specific engineering decisions, special features, unusual requirements, etc., shall be explained or summarized as applicable. If it is necessary to deviate from criteria or standard practice, reasons shall also be included. Design statements shall be provided in sufficient detail to enable the reviewer to get a clear picture and understanding of all included work so that approval will be granted. Design analysis shall include the following:

1.5.1.1 References

Provide design references used in preparing the utility design.

1.5.1.2 Exterior Gas Distribution

A narrative of the exterior gas distribution systems design and applicable criteria used shall be provided. Include the peak demands and equipment input ratings, length of pipe, itial pressure and the pressure loss. A description of the gas distribution system, a listing of allowable piping materials and preliminary calculations necessary to support equipment and piping sizes shall be provided.

1.5.1.3 Underground Chilled Water Piping

A narrative of the underground chilled water distribution systems design and applicable criteria used shall be provided. Include the flow rate, velocity and the rate of pressure loss. A description of the underground chilled water distribution system, a listing of allowable piping materials and preliminary calculations necessary to support equipment and piping sizes shall be provided.

1.5.2 Pipe Sizing Calculations

1.5.2.1 Exterior Gas Distribution

Provide site map, intial pressure, pressure drop, total input rating of all gas burning appliances within the facility and resultant pipe sizes as specified in NFPA 54 and section 01012, SITE WORK/CIVIL/UTILITIES.

1.5.2.2 Underground Chilled Water Piping

Pipe sizing and pump head calculations for the chilled & heating hot water, plumbing, gas piping systems as specified in Section 01016, MECHANICAL REQUIREMENTS shall be provided.

1.5.3 Exterior Utility Drawings

The following exterior utility drawings shall be provided for both exterior gas distribution system and for the exterior underground chilled water pipe between the mechanical equipment room and the chiller and fluid cooler:

1.5.3.1 Removal Plan

All existing exterior mechanical utilities and utilities which are to be

removed shall be indicated on the Site Removal Plan located in the civil section of the drawing package.

1.5.3.2 Utility Plan

All existing and new mechanical utilities shall be indicated on the Site Composite Utilities Plan located in the civil section of the drawing package. The location of existing exterior utilities shall be thoroughly checked and indicated on plans and profiles, thus preventing interference with new services. The utility drawing shall indicate all new utilities, including tie-in points, and existing utilities which are to be abandoned.

1.5.4 SPECIFICATIONS

The submitted 35 percent technical guide specifications shall be updated, completely edited, and fully coordinated with the drawings to accurately and clearly identify the 60 percent product and installation requirements for the facility. Technical specifications shall be Unified Facilities Guide Specifications (UFGS), which shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility as specified in Section 02000, DIVISION 2: SITE WORK - OUTLINE SPECIFICATIONS. The UFGS specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. All UFGS specification indexes shall be completely edited to reflect the paragraphs retained in the body of the technical specification. All references that have not been used in the body of the technical specification shall be edited from the UFGS specification. Technical specifications shall be coordinated with the plans and include all items contained within the project. Provide special sections to cover those subjects for which no UFGS guide specification is available. Specific items of equipment identified in the UFGS specifications but not required for the facility shall be edited out. All edited UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added. Government conformance review is required for any specification addition or deletion.

1.5.4.1 Items NOT to be Fast Tracked

If fast tracking is not intended the contractor shall submit a list of specifications intended for final design.

1.5.4.2 Items to be Fast Tracked

Fully edited and coordinated technical guide specifications as specified above and in Section 02000, DIVISION 2: SITE WORK - OUTLINE SPECIFICATIONS shall be submitted, reviewed and approved to accurately and clearly identify the final product and installation requirements for every item to be installed before the design is complete and approved prior to the installation of the subject item.

1.6 ARCHITECTURAL SUBMITTAL

The 35% architectural design submittal confirms the building foot print, establishes the height of the building, typical wall sections and confirms the location of interior items requiring under slab utilities. Additionally, it confirms the exterior building materials and building elevations.

1.6.1 Drawings

The Thirty Five percent architectural drawing submittal shall consist of the overall floor plans, enlarged floor plans, all exterior elevations, several building sections showing the selected structural systems. A typical exterior wall section establishing the wall thickness and materials. An exterior wall section through multi-purpose room. The floor plans shall take into account the structural system selected. Location of all columns, bracing and and required bearing walls shall be shown for the structural system selected.

1.6.1.1 Floor Plans

Provide a double line Floor Plan, drawn at the largest scale practicable to include the entire building on a single sheet. See paragraph on Drawing Scales for plan scale requirements. Floor plans shall essentially be complete with the exception of large scale detail referencing. Floor plans shall be scaled double-line drawings showing the functional arrangement, pocheing, location of all openings and plumbing fixtures, all section cuts, wall types, all notes and leaders, all general notes, and all dimensions shall be completed. The plans shall indicate door swings, door numbers and window type. A north arrow shall be shown on each floor plan. The composite plan sheet shall include a gross area tabulation comparing the actual square meters with the RFP required square meters of the facility. Architect-Engineer suggestions for plan improvement shall be fully shown and justified. Include the following:

Overall, control, and door/ window opening dimensioning.
Match lines for combining individual portions of floor plans.
Room names and numbers.
Structural column or bay indicators.
Wall and building section cuts.
Door swings and door numbers.
Window types.
Area in square meters.
General notes.

Where major structural elements are included as parts of architectural detailing, do not indicate sizes. These elements should all be fully defined as part of the structural design documents. Major elements of mechanical and electrical equipment affecting room size or shape, shall be shown on the architectural plans to a practicable extent and coordinated with other respective disciplines. When applicable, Government-furnished, Contractor-installed, or Government-furnished and Government-installed items shall be shown as a dashed line.

1.6.1.2 Building Elevations

Provide all building elevations complete showing the appearance and architectural treatment. Elevations shall be dimensioned to show total height, and relation to grade. Critical elevations such as top of finish floor, top of steel, etc. shall be indicated. All notes for materials shall be included. See paragraph on Drawing Scales for Exterior Building Elevation scale requirements.

1.6.1.3 Building Sections

Building cross section and longitudinal sections shall be included to show general interior volumes, construction methods, and height of ceilings and partitions. Identify materials used and necessary dimensions. See paragraph on Drawing Scales for Building Section scale requirements. The level of finished floor shall be indicated as EL.= 10 000. Elevations for footings, etc., shall be related to this figure. Sea level elevations shall not be shown on the building drawings.

1.6.1.4 Wall Sections

Drawings shall include typical exterior wall sections showing vertical control elevations and dimensions, with all materials labeled. The sections should normally be cut through doors, windows, and other critical wall section locations. Wall sections shall not be broken. Additional details shall be included when necessary to illustrate important or unusual features. All horizontal dimensions shall occur on the plans and vertical dimensions on the sections and elevations. See paragraph on Drawing Scales for Wall Section scale requirements.

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1.6.1.5 Drawing Scales

	IIIIIIC
Composite Plans (Note 1)	Varies
Enlarged Floor Plans	1:100
Reflected Ceiling Plans	1:100
Detail Plans (Note 2)	1:20
Roof Plans	1:100
Exterior Elevations	Same scale as plan
Interior Elevations	1:20
Interior Toilet Elevations	1:20
Building Cross Sections	1:100 or 1:50
Wall Sections (Note 3)	1:10
Stair Sections	1:20
Details (Note 2)	1:5
Wall Types	1:10
Fire Protection Plans (Note 1)	Varies

Notes:

- 1. Scale of composite plan shall be as required so that the entire facility is drawn on one sheet without break lines.
- 2. The goal of this requirement is that the details be large enough to show all fixtures, accessories, equipment, materials, manner of construction, clearances required for proper maintenance, and complete dimensions. Toilet rooms and Equipment rooms are examples of the kind of spaces which shall be drawn as a Detail Plan.

1.6.1.6 Legends

Standard architectural material symbols used on the drawings shall be provided as a separate architectural legend drawing located just in front of the architectural drawings in the set. Additional material symbols

should be added to the Legend Sheet as needed for the project.

1.6.1.7 North Arrows

North arrows shall be oriented the same direction on all plan sheets and by all disciplines; including site and civil drawings. Plan north shall be "up" or the left on the drawings. Indicate true north on composite plan drawings. North arrows shall be located approximately at the same location on all sheets.

1.6.1.8 Symbols

The Room and Door Numbering system shall be consistent. The standard symbols for Amendments (a triangular box) or Modifications (a type of circular box, see the chapter on Drafting Criteria) to the contract shall not be used for any other purpose, and care must be taken to avoid using even similar appearing but technically different symbols. Room numbering shall start at the main entrance and proceed clockwise around functional areas.

1.6.1.9 Dimensions

When dimensioning, use arrowheads, not dots or slashes. Dimensions must be complete, accurate and fully coordinated. Do not edit dimensions when elements must be moved; Use the CADD systems automatic dimesioning system and relocate elements as required. Dimensions should be to points easily measurable in the construction, and should be laid out to eliminate refiguring in the field. Dimensions should be tied-in to column lines, etc., to facilitate checking. Plan dimensions for frame construction should be to face of stud (or sheathing) for exterior walls, to one face of stud for interior partitions, and to centerline of openings. For masonry construction, dimensions should be to one or both nominal faces of masonry and to jambs of openings.

1.6.2 Design Analysis Narrative

The Design Analysis shall be essentially complete with emphasis on the following:

1.6.2.1 Basic Criteria Statement

A statement indicating the basic criteria to be applied to the design including type of construction (noncombustible, etc.), category of construction (permanent, etc.), major fire protection and exit requirements, etc.

1.6.2.2 Description of Materials

A description of materials for all major building components and exterior finishes ascertaining their matching of existing. The description of materials must include type of exterior wall construction, window types, panel materials, etc. The description of finishes may be presented in schedule form. The written presentation must include the designer's reasons for selecting specific materials, architectural compatibility, and architectural treatment in all cases in which the reason for selection is

not obvious.

1.6.2.3 Design Analysis Calculations

- a. Basic Uniform Building Code building area calculations to determine type of construction and allowable building areas.
- b. Net room areas, occupant capacity and gross building areas.

(Categorize areas and capacities under the titles of "Operational Space Requirements", "Administrative Space Requirements", "Storage Space Requirements", and "Support Space Requirements".)

c. U-values for each wall, window, door, or roof type selected.

The minimum U-values must consider the life cycle cost of the operation of the building. The minimum insulation values are R=14 for opaque wall sections and r=30 for roof insulation.

1.6.2.4 Additional Criteria/Clarification

A list of items on which additional criteria, clarification, or guidance is required.

1.6.3 Specifications

Architectural specifications are not required at this submittal.

1.7 STRUCTURAL SYSTEM

Description of the structural system for original designs. A general description of the structural system for the building/structure including seismic considerations should be given with reasons for selection of the system used.

1.7.1 Roof and Floor System.

General method of framing and type of deck. Address the type, span to depth ratios and classification of the diaphragm. Address features which impact the layout of the structural framing, such as standing seam metal roofing.

1.7.2 Walls and Partitions

Describe composition and general range of thicknesses, seismic design , method of providing lateral support for the partitions, and location of load bearing and shear walls.

1.7.3 Foundation System

Foundation design data or assumptions and description of type of foundation

system to be used for the buildings and/or structures. For example, whether spread footings, continuous footings with concrete foundation walls, piling or drilled piers with concrete grade beams are used, existence of foundation tie beams, etc. Address concrete slab-on-grade floors, locations of capillary water barrier, and the general arrangement, approximate spacing and types of crack control joints.

1.7.4 Foundation System (Fast Tracking)

All the following structural requirements must be met by the Design/Build contractor prior to the construction of the foundations;

- a. The Contractor must have complete and approved final (100% completed) design analyses. The design analyses shall include complete detailed calculations showing the analysis and the design of the gravity and the lateral load resisting systems. All the review comments made by the Government must be resolved and incorporated.
- b. Locations of the gravity and the lateral load carrying elements and the foundation loads must be finalized prior to the design of foundations.
- c. Approved final drawings showing the locations of the vertical and lateral load resisting system including the redundancies provided for the lateral load resisting system.
- d. Approved foundation shop drawings showing the size and the spacing of the reinforcement.
- e. Approved final drawings showing Base plate design, Anchor bolt layout details and embedded items.
- f. Approved complete design, including reinforcing bar locations, for concrete masonry walls and reinforced concrete walls.

1.8 DESIGN CRITERIA

A list of design criteria references such as U.S. Army Corps of Engineers Technical Instructions, Department of the Army Technical Manuals, ACI Standards, AISC Specifications, etc. which are applicable to the immediate project.

1.8.1 DESIGN LOADS AND CALCULATIONS

A list of structural design loads and calculations comprised of, but not limited to the following:

Floor live loads, identifying each loading with usage and the room or space where used. For "heavy-duty" slab-on-grade floors subjected to wheel loads, identify the type and size of vehicles plus the maximum wheel or axle load. If only human occupancy loads are anticipated, so state. Truck loads for the design of the truck loading docks.

Calculations for determine building/structure design loads, including all dead loads, roof and floor(s) live loads. Determination of snow loads, including rain-on-snow, drift, and sliding snow loads as applicable.

Calculations of seismic/wind loads and main force resisting system.

Description of method of providing lateral stability for the proposed structural system to meet these seismic and/or wind loads with sufficient calculations to verify adequacy of the proposed method.

Calculations for typical roof, floor(s) and foundation members as applicable for the structural system proposed to be used

Structural connections used to fasten the major structural components of the basic structural system (both vertical and lateral) can either be narratively described or supported by sketches.

1.9 FOUNDATION DESIGN CRITERIA

Foundation design criteria, including the design depth for footings, allowable soil bearing pressure, equivalent fluid densities (or lateral earth pressure coefficients) for the design of earth retaining structures and building components, modulus of subgrade reaction, and any other pertinent data derived from the recommendations of the Preliminary Foundation Analysis, a copy of which shall be included as an **Appendix** to the design analysis.

1.10 DESIGN DATA

A list of structural materials, together with the stress grades an/or ASTM designations, as applicable, for timber, structural steel, concrete, and reinforcing steel; the series for steel joists; and identification of the proposed use of each material in each building structure, including allowable soil properties (with source notation).

1.11 DESCRIPTION OF MISCELLANEOUS/UNUSUAL DESIGN FEATURES

Those which might be controversial should be clearly presented in such a manner that definite approval can be given. Where applicable to the immediate project, include a description of each of the following design features:

The proposed system for resisting lateral forces (wind and earthquake) and transferring them to the ground, whether diaphragms, shear walls, braced or moment resisting frame, etc.

The proposed treatment of any unusual structural features or unique solutions to structural problems.

Measures taken to compensate for expansion/contraction and crack control.

Identification of any major vibrating elements and measures taken to isolate them.

1.12 Concept Design, Structural Drawings

show structural roof and floor framing by wall sections and partial framing plans in sufficient detail to indicate type of framing, estimated overall depth, spacing of all structural members and the types and locatons of lateral load resisting system selected. Type of foundations and their approximate elevations shall be shown. The location of all columns must be shown. Proposed treatment of cantilever footings, combined footings, and all other complex details shall be shown on concept drawings. Structural drawings to be included in the concept submittal shall consist, as a minimum, the following:

If available, show the logs of exploratory drill holes and their location together with relative vertical elevation of building footings.

Foundation plan showing footings, piling, and column locations as applicable.

Floor and roof framing plans. Typical framing elevations and cross section.

1.13 MECHANICAL

Compliance with the design requirements for the building mechanical systems will be determined by a review of the submitted 35 percent design analysis, design calculations, drawings and specifications. Any conflicts in the design requirements or lack of thorough understanding of the nature and scope of work shall be identified and resolved prior to submittal of the 35 percent design.

1.13.1 DESIGN ANALYSIS NARRATIVE

The narrative portion of the design analysis shall contain a narrative description and analysis for each of the mechanical portions of the design. The basis and reasons for specific engineering decisions, special features, unusual requirements, etc., shall be explained or summarized as applicable. If it is necessary to deviate from criteria or standard practice, reasons shall also be included. If alternatives were to be evaluated and selected by the designer, findings (pros and cons) and conclusions shall be included. Design statements shall be provided in sufficient detail to enable the reviewer to get a clear picture and understanding of all included work so that approval will be granted. Narrative shall be complete relative to scope and intended design approaches. The total scope projected to final design shall be outlined in a form that will be conveniently adapted, expanded, and detailed at the final design stage. The design analysis shall carry a complete narrative for every item and system covered in the design, and shall include, but not be limited to, the following:

1.13.1.1 Index

Provide a design analysis index identifying all main and sub-paragraph headings.

1.13.1.2 Project Summary

Provide a brief description of the facility and/or mechanical design objectives.

1.13.1.3 Applicable Criteria

A list of all applicable criteria used for basis of design.

1.13.1.4 Technical Specifications

Provide a list of Specifications that will be used for the project. When items are to be fasttracted, than all applicaable specifications shall be fully editted and approved

1.13.1.5 Design Conditions

A list of Mechanical design conditions including elevation, latitude, heating/cooling degree days, winter and summer outside design temperatures, inside design temperatures for all spaces, ventilation rates, occupancy rates, ground or make up water temperatures, etc. shall be provided.

1.13.1.6 System Descriptions

Provide a complete description of all building systems; include the designer's reasons for selecting specific materials, systems, etc. in which the reason for selection is not obvious. System descriptions shall be include, but not limited to, the following:

Plumbing Systems
Domestic Hot Water Heating Systems
Exterior Gas Distribution Systems
Interior Gas Piping Systems
HAVC Hot Water Heating Systems
Chilled Water Systems
Refrigeration Systems
Air Supply and Distribution Systems
Ventilation and Exhaust Systems
Exhaust Hoods
Cold Storage Refrigeration Systems
Food Service Equipment
Temperature Control Systems

1.13.1.7 Sustainable Design

The Design Analysis shall include the proposed sustainable design objectives with reference to mechanical systems and design work which will be attained as part of this project.

1.13.1.8 ENERGY CONSERVATION

Mechanical designs shall be economical, maintainable and energy conservative with full consideration given to the functional requirements and planned life of the facility. Each major item of proposed mechanical equipment shall have a net efficiency rating that is equal to or exceeds the net efficiency ratings of similar or equal equipment of the four manufacturers each having one of the four highest ratings. The Design Analysis shall include the proposed energy conservative objectives with reference to mechanical systems and design work which will be attained as part of this project.

1.13.2 CALCULATIONS

The design analysis calculations shall include the heating, cooling, and ventilation load calculations to determine the selection of the type and size of mechanical equipment to be used. Design calculations shall be provided in sufficient detail to enable the reviewer to get a clear understanding of all work to allow approval. Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials, performance of specific systems or equipment. Manufacturer's catalog data sheets shall be provided for each item of equipment selected. Calculations shall be performed by computerized procedures as specified in Section 01016, MECHANICAL REQUIREMENTS. Use of standardized charts, curves, tables, graphs shall not be acceptable for portions of required calculations in lieu of specific calculation

procedures, except when the charts, curves, tables, and/or graphs are part of the manufactures' proprietary published selection procedure/data to determine the output capacity, pressure drops, etc of the equipment being selected. Design calculations and computations shall be provided for all systems and shall include, but not limited to, the following:

1.13.2.1 Index

Provide a design analysis index identifying all calculation items.

1.13.2.2 Equipment List

When complete equipment schedules are not included in the drawings, than a complete list of all mechanical, HVAC and plumbing equipment intended for design and construction shall be provided. For each piece of equipment, the list shall include an equipment tag , a description, a capacity, electrical requirements, dimensions and all clearances required for maintenance.

1.13.2.3 Building Thermal Properties

Provide calculations, as specified in Section 01016, MECHANICAL REQUIREMENTS, that demostrate the surfaces to be constructed comply with the minimum "U" Values specified.

1.13.2.4 Room by Room Air-Conditioning Loads

Preliminary load calculations shall be performed by computerized procedures as specified in Section 01016, MECHANICAL REQUIREMENTS. A tabular summary of all psychometric calculations for each area or room shall be provided on each air distribution system. The summary shall include the dry bulb temperature, wet bulb temperature, relative humidity, enthalpy and dew point for the system air volume at coil entering, coil leaving and supply air conditions. The summary shall include the individual space sensible and latent loads and the resultant dry bulb temperature, relative humidity and dew point temperature based on the supply air volume provided at the supply air conditions listed for each space served by the distribution system. A tabular summary of all load calculations for each area or room, including ventilation loads, combustion air heating loads, etc., shall be provided. A copy of all input and output printouts shall be provided.

1.13.2.5 ASHRAE Standard 62 Mechanical Ventilation

For each area or room, which requires mechanical ventilation per ASHRAE standard 62; provide calculations as specified in Section 01016, MECHANICAL REQUIREMENTS, including louver selection and catalog fan data.

1.13.2.6 Kitchen Ventilation

For each area hood required for removal of grease or condensate; provide calculations including applicable criteria, exhaust and make up air volumes, minimum velocities, louver selection and catalog fan data.

1.13.2.7 Mechanical Ventilation

For each area or room requiring mechanical ventilation for cooling; provide calculations similar to zone air-conditioning, louver selection, and catalog fan data.

1.13.2.8 Toilets/Janitor Room Ventilation

Provide calculations, as specified in Section 01016, MECHANICAL REQUIREMENTS, catalog fan data, and louver selections, for each toilet area or group of toilet areas.

1.13.2.9 Building Air Balance

After all individual ventilation requirements specificied above have been calculated, a sumary showing each individual requirement and the overall combined effect on the facility as a whole shall be provided. The summary shall also include any corrective action required to maintain building pressurization as specified in Section 01016, MECHANICAL REQUIREMENTS.

1.13.2.10 Mechanical Items to be Fast Tracked

All final calculations as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every piece of mechanical, HVAC and/or plumbing equipment to be installed before the full facility design is complete and approved prior to the installation of the subject item.

1.13.2.11 Site, Architectural and Structural Items to be Fast Tracked

Pior to the installation of any structural foundations the size of the mechanical room shall be verified and all piping to be installed below the slab on grade floor shall be fully designed and approved as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS. All final calculations as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements, including all maintenance clearances, for every piece of mechanical, HVAC and/or plumbing equipment to be installed within the foot print of the mechanical room and all piping to be installed below the slab on grade floor. When grading or building surface is to be fast tracked, than all final calculations as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every mechanical, HVAC and/or plumbing distribution system that penitrates the installed grading or surface prior to the installation of the subject grading or surface.

1.13.3 CONSTRUCTION DRAWINGS

The 35 percent design drawings shall be fully coordinated with the design analysis. Provide sufficient plans, sections and schedules shall be provided as necessary to define the required design intent and verify the required size of the mechanical equipment room. The designer shall show on the construction drawings all items which are referred to with phrases such as "as shown", "as indicated", "as detailed", etc within the UFGS Specifications. The construction drawings shall show, to scale, the actual equipment to be installed and all required clearances required for operation, routine maintenance, and replacement of minor and major components. The drawings shall not show any piping, ductwork or other

mechanical equipment to be exposed in finished spaces except where approved by the government. All exposed items shall be called out to the government for approval before proceeding. Access panels required for concealed items shall be shown on the construction drawings. The design and installation shall be fully coordinated with all other trades involved in the design and construction of the facility. Special care shall be given to National Electric Code requirements for clearance in front of and above electrical equipment. The construction drawing shall be produced to incorporate the requirements below into all drawings. Furthermore, the requirements below shall be repeated in the form of general notes on every mechanical (both HVAC and plumbing) construction drawing that shows a plan view. General notes shall include any mechanical general installation notes that may be required to clarify the construction intent that may not be readily apparent in the specifications or on the drawings. General notes may be provided on a separate sheet if space does not exist on the plan sheets. Sheet reference number sequencing shall be in accordance with the A/E/CCADD Standards Manual, ERDC/ITL TR-01-6. Submittal drawings shall include, but not limited to, the following:

1.13.3.1 Drawing Clarity

All drawings specified below, when reproduced at half scale, shall be clear and easily readable as determined by the Contracting Officer's Representative (COR).

1.13.3.2 Drawing Coordination

Show on all mechanical drawings specified below, all items of mechanical equipment and systems, to determine proper space allocation within the limits of the architectural, structural and electrical layout requirements. Plans, elevations, and sections shall be developed sufficiently to insure that major equipment items, piping, and ductwork cause no interference with architectural members, structural members, electrical equipment, etc.

1.13.3.3 Index Sheet

An index sheet identifying all mechanical drawings shall be provided, including those drawings anticipated to be provided in the 100 percent design submittal. Index shall include drawing design file numbers, drawing numbers, sheet numbers, and drawing descriptions.

1.13.3.4 Mechanical Items to be Fast Tracked

All final drawings including fully edited and coordinated control drawings as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in TI 810-11 shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every piece of mechanical, HVAC and/or plumbing system, equipment and the final control requirements for every piece of HVAC equipment to be installed before the full facility design is complete and approved prior to the installation of the subject item.

1.13.3.5 Site, Architectural and Structural Items to be Fast Tracked

Pior to the installation of any structural foundations the size of the mechanical room shall be verified and all piping to be installed below the slab on grade floor shall be fully designed and approved as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL

REQUIREMENTS. All final drawings as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements, including all maintenance clearances, for every piece of mechanical, HVAC and/or plumbing equipment to be installed within the foot print of the mechanical room and below the slab on grade floor. When grading or building surface is to be fast tracked, than all final drawings as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every mechanical, HVAC and/or plumbing distribution system that penitrates the installed grading or surface prior to the installation of the subject grading or surface.

1.14 Concept Design, Electrical Drawings

Provide one line diagram that indicates the size of the service and the number of panelboards required for the facility. Provide one line diagram of the communications and fire alarm system that indicates large components of the system. Provide site plan that indicates facility service size and route of conduit. All other electrical information should be included in a design narrative. Information shall include a detailed description of all systems included in the RFP. It shall include calculations for the facility service including demand factors and spare capacity. It shall include cut sheets of the type of major equipment that will be provided including light fixtures. Any electrical item that will be considered for fast tracking will be required to be designed to a 100% level for this submittal. All systems that are indirectly related to the fast tracking items shall be identified and designed to the 100% level.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION 01020

60 PERCENT DESIGN REQUIREMENTS

PART 1 60 PERCENT DESIGN SUBMITTALS

Attachments: Code Analysis

ADA Architectural Design Checklist

For general submittal requirements, See Section 01331 SUBMITTALS FOR DESIGN.

1.1 SITE PLANNING

In addition to the following requirements the 60% submittal shall include incorporation of all comments from the 35% design.

1.1.1 Drawings

1.1.1.1 Location Plan and Vicinity Map

The Location Plan and Vicinity Map provided in the Request For Proposal (RFP) shall be updated as necessary and included in the drawings. The Location Plan shall include the Contractor's Access Route, Staging Area, and the Project Site.

1.1.1.2 Construction Phasing

The construction phasing plan will show how the Contractor will maintain access to the existing Youth Services Center (6:00 A.M. to 6:00 P.M. Monday thru Friday) for the duration of the contract. At all times access to parking for both the staff and customers shall be provided. In addition access for bus drop off in front of the existing facility shall be available. Phasing plan shall include any signage, temporary access drives, or temporary parking needed.

1.1.1.3 Removal Plan

The removal plan will show the existing physical features and condition of the site before construction. Each physical feature to be removed shall be hatched as indicated on the standard legend sheet, a legend on the removal plan, and properly noted: to be removed, to remain, or to be relocated. The Removal Plan shall be prepared at the same drawing scale and use the sheet boundaries as the Site Plan.

1.1.1.4 Site Plan

The Site Plan shall show all the site layout information necessary to field locate the building, parking lots, roads, sidewalks, and all other appurtenances to be constructed as part of the project. All major site work to be constructed will be dimensioned for size and location. The Site Plan will identify all site-related items such as: curbs, pavements, walks, bollards, trash enclosures, chiller units, electrical transformers locations, etc. in accordance with a standard legend sheet or with additional legends or notes. Drawing scales of between 1:250, 1:300, and 1:400 are acceptable scales for the Site Plan.

The contractor shall provide a layout of the playground area at a scale of 1:50. Layout shall include dimensioning of each play area, all playground equipment, and playground surfaces. All playground equipment and safety surfaces shall be approved by the users.

The contractor shall provide a layout drawing at a scale of 1:20 for the approved architectural paving (price option), for the area between the new and existing building.

The contractor shall consider the project's construction area, drawing legibility, number of sheets required in choosing the drawing scale. The Site Plan, prior to adding the dimensions and notes, should serve as the base sheet to other Plans, such as: Utilities Plan, Grading and Drainage Plans and Landscape Plan. Existing and proposed contours or utility lines shall not be shown on Site Plan. Physical features that will remain after the proposed construction has been completed shall be shown. This plan, or the Location Plan, will also show any free zones, construction limits, etc. Whenever the Site Plan occupies more than one sheet of drawings, a Key Plan shall be included. Additional plans showing specific areas of the site in smaller scales can be included if more detail is necessary.

1.1.1.5 Site Details

The Contractor shall provide designs and details as necessary for site furnishings, accessories, accessible parkings stalls and ramps, bollards, signage, striping, and any other site structure or item requiring a detail for clarity and construction accuracy.

The Contractor shall provide details of all playground equipment and safety surfacing. Provide manufacturer information for all equipment and surfacing to be installed. Approval of equipment and surfacing is required prior to final design.

Provide details for the approved layout of the architectural paving (price option) designed for the area between the new and existing buildings.

1.1.1.6 Landscape Plans

A detailed Landscape Plan showing trees, shrubs, ground covers, seeded and sodded areas, shall be prepared by the Contractor. The Landscape Plan shall be prepared by a fully qualified, experienced professional Landscape Architect. The Contractor shall specify types of plant materials that are locally grown, commercially available and acclimated to the project environment. The Landscape Plans shall include a plant materials schedule or listing. This schedule shall include botanical names, common names, key, size and the method of transplanting. The Landscape Plan shall also show all unsurfaced ground areas disturbed by construction within the project limits with these areas shown to be seeded, sodded, or mulched as required.

Landscape plans shall clearly identify the basic and option portions. The basic contract portion is the landscaping associated with the playground. The lanscaping option is that associated with the front of the building and the parking.

1.1.1.7 Landscape Details

The Contractor shall verify the methods of planting to meet the project site/installation requirements and provide the necessary Landscape Details

to perform the contract design work. Details shall reflect local practices and conditions for installation.

1.1.1 Specifications

Provide a listing by title and number of all Technical Specifications proposed for use in the final site design.

1.1.2 Design Analysis Narrative

Design analysis shall include the following:

1.1.3.1 Design References

Design references used in preparing the site design.

1.1.3.2 Basis, Specific Goals, Objectives and Priorities For Site Design

The Design Analysis should give the basis, specific goals, objectives and priorities for site design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during design. The 60 percent Design Analysis must be approved and accepted before Final Design.

1.1.2.1 Sustainable Design Objectives

The Design Analysis shall include the proposed sustainable design objectives with reference to site planning and civil design work which will be attained as part of this project.

1.2 CIVIL

In addition to the following requirements the 60% submittal shall include incorporation of all comments from the 35% design.

1.2.1 Drawings

1.2.1.1 Grading and Drainage Plan

A preliminary grading and drainage plan showing the proposed layout of all new culverts and roof drains shall be provided at the same scale as the site plan. Existing grading contours shall be indicated at 0.20 meter contour intervals. New grading contours shall be shown. Indicate finished floor elevation of the new building. Plans shall show the layout of the new and existing storm drain and roof drain system. Also include layout of subdrains. Storm drain system shall be labeled. The rim elevations of all manholes, curb inlets, and area inlets shall be indicated.

1.2.1.2 Typical Pavement Sections

Provide typical pavement and road sections and details showing interface between new and existing pavements and new pavements of different sections.

1.2.2 Specifications

Provide a listing by title and number of all Technical Specifications

proposed for use in the final civil design.

1.2.3 Design Analysis Narrative

Design analysis shall include the following:

1.2.3.1 References

Design references used in preparing the civil design.

1.2.3.2 Grading

A narrative of the grading design and criteria used.

1.2.3.3 Pavements

A narrative of the pavement design and criteria used plus design calculations used to obtain the pavement design. Include copies of programs and manuals used to develop the pavement design sections.

1.2.3.4 Drainage

A narrative of the drainage design and criteria used. Include information on the culvert pipe materials anticipated to be used.

1.2.3.5 Basis, Specific Goals, Objectives and Priorities For Civil Design

The Design Analysis should give the basis for the civil design and should establish specific goals, objectives and priorities for civil design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during design. The 60 percent Design Analysis must be accepted before Final Design.

1.3 GEOTECHNICAL

See Civil and Structural Design Requirements.

1.4 WATER SUPPLY AND WASTEWATER

1.4.1 Drawings

1.4.1.1 Water Distribution and Sewage Collection Systems Plan (including building services)

Provide all existing utilities and above ground features which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Exclude siting notes and dimensions from the plan. Provide all proposed new water and sewer lines with preliminary sizes. This shall include all new service lines up to the 1.5 meter building line. Show the proposed locations of all new manholes, fire hydrants, valves (including PIV's), and connection points.

1.4.1.2 Water Distribution and Sewage Collection Systems Profiles

Profiles of all gravity sewers and waterlines shall be provided. Profiles may be omitted for short waterlines, unless necessary to assure adequate cover or avoid interference with other underground facilities. Indicate

existing pipe material and sizes where new lines connect. Indicate type of connection and elevation. Include all interference elevations.

1.4.1.3 Water Distribution and Sewage Collection Systems Details

Appropriate water and sewer details shall be provided. The standard detail sheets will be furnished if required. For roadway pavement crossings, indicate installation method (boring, jacking, trenchless excavation, etc.). Include standard casing details.

1.4.2 Specifications

Specifications shall be coordinated with the plans and include all items. Provide a listing of specifications to be provided. Provide a complete copy of special sections to cover those subjects for which no UFGS guide specifications are used or available.

1.4.3 Design Analysis Narrative

Design analysis shall include the following:

1.4.3.1 References

Provide design references used in preparing the water and wastewater design.

1.4.3.2 Water Supply and Distribution Systems

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the fire flow required and the available flow and residual pressures. A description of the water distribution system, a listing of allowable piping materials, hydrant flow test data and preliminary calculations necessary to support equipment, piping sizes, fire and domestic demands, etc., shall be provided.

1.4.3.3 Wastewater and Sewers

Based on existing information the sanitary sewer system in the vicinity of the proposed facility is assumed to be adequate to carry the flows expected to be generated by the new facility. A narrative of the wastewater supply design and applicable criteria used shall be provided. Include the preliminary calculations used to design the average and peak contributing flows. Field verify the available capacity and full flow capacity of the existing system to ensure that it will be adequate for the flows generated by the new facility. Include the available capacity and full flow capacity in the design analysis. Preliminary calculations necessary to support equipment and piping sizes and a listing of allowable piping materials shall be provided.

1.5 Exterior Gas Distribution System

1.5.1 Design Narrative

The 60 Percent Design Analysis Narrative shall include the information presented in the 35 percent submittal. The information shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the 60 percent design.

1.5.2 Pipe Sizing Calculations

The 60 percent calculations shall include all the information presented in the 35 percent submittal, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the 60 percent design. In addition, new calculations shall be as specified in Section 01019, 35 PERCENT DESIGN REQUIREMENTS and the narritive sections (01012 and 01016) referenced there.

1.5.3 Exterior Utility Drawings

The 60 percent drawings shall include all the information presented in the 35 percent submittal, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the 60 percent design. In addition, any new drawings shall be as specified in Section 01019, 35 PERCENT DESIGN REQUIREMENTS.

1.5.4 SPECIFICATIONS

The submitted 35 percent technical guide specifications shall be updated, completely edited, and fully coordinated with the drawings to accurately and clearly identify the 60 percent product and installation requirements for the facility. Technical specifications shall be Unified Facilities Guide Specifications (UFGS), which shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility as specified in Section 02000, DIVISION 2: SITE WORK - OUTLINE SPECIFICATIONS. In addition, new specifications shall be as specified in Section 01019, 35 PERCENT DESIGN REQUIREMENTS and the narritive sections (01012 and 01016) referenced there.

1.5.4.1 Items to be Fast Tracked

All items to be fast tracted shall be as specified in Section 01019, 35 PERCENT DESIGN REQUIREMENTS.

1.6 ARCHITECTURAL

1.6.1 Drawings

The Sixty percent architectural drawing submittal shall be a complete set of architectural drawings without large scale details. All other drawings shall be complete except referencing of the large scale details.

1.6.1.1 Floor Plans

Provide a double line Floor Plan, drawn at the largest scale practicable to include the entire building on a single sheet. See paragraph on Drawing Scales for plan scale requirements. Floor plans shall essentially be complete with the exception of large scale detail referencing. Floor plans shall be scaled double-line drawings showing the functional arrangement, pocheing, location of all openings and plumbing fixtures, all section cuts, wall types, all notes and leaders, all general notes, and all dimensions shall be completed. The plans shall indicate door swings, door numbers and window type; door and window schedules are required. A north arrow shall be shown on each floor plan. Enlarged toilet and stair plans shall also be included. The first composite plan sheet shall include a gross area tabulation comparing the actual square meters with the authorized square meters of the facility. Architect-Engineer suggestions for plan improvement shall be fully shown and justified. Include the following:

Overall, control, and door/ window opening dimensioning.
Match lines for combining individual portions of floor plans.
Room names and numbers.
Structural column or bay indicators.
Wall and building section cuts.
Door swings and door numbers.
Window types.
Area in square meters.
General notes.
All Floor & Wall Patterns/Borders.

When dimensioning, use arrowheads, not dots or slashes. Where major structural elements are included as parts of architectural detailing, do not indicate sizes. These elements should all be fully defined as part of the structural design documents. Major elements of mechanical and electrical equipment affecting room size or shape, shall be shown on the architectural plans to a practicable extent and coordinated with other respective disciplines. When applicable, Government-furnished, Contractor-installed, or Government-furnished and Government-installed items shall be shown as a dashed line.

1.6.1.2 Reflected Ceiling Plans

Reflected ceiling plans shall be complete including all electrical lights, mechanical supply & diffusers, notes, complete legends and pocheing of all materials to be used. See paragraph on Drawing Scales for reflected ceiling plan scale requirements.

1.6.1.3 Roof Plan

Roof plans shall be complete including all notes, legends, slope indications, gutter and downspout locations, and roof overflow drains. All elements located on the roof shall be coordinated with all disciplines. See paragraph on Drawing Scales for roof plan scale requirements. Roof mounted equipment should be limited to exhaust fans, vents, and intakes, no large pieces of equipment shall be allowed to be mounted on the roof.

1.6.1.4 Building Elevations

Provide all building elevations complete showing the appearance and architectural treatment. Elevations shall be dimensioned to show total height, and relation to grade. Critical elevations such as top of finish floor, top of steel, etc. shall be indicated. All notes for materials shall be included. See paragraph on Drawing Scales for Exterior Building Elevation scale requirements.

1.6.1.5 Building Sections

Building cross section and longitudinal sections shall be included to show general interior volumes, construction methods, and height of ceilings and partitions. Identify materials used and necessary dimensions. See paragraph on Drawing Scales for Building Section scale requirements.

1.6.1.6 Wall Sections

Drawings shall include all wall sections and stair section conditions including corridors, showing vertical control elevations and dimensions, with all materials labeled. The sections should normally be cut through

doors, windows, and other critical wall section locations. Wall sections shall not be broken. Additional details shall be included when necessary to illustrate important or unusual features. All horizontal dimensions shall occur on the plans and vertical dimensions on the sections and elevations. See paragraph on Drawing Scales for Wall Section scale requirements.

1.6.1.7 Door, Window, and Louver Schedules

Door schedule shall be complete in accordance with Corps of Engineers (COE) standard format. Schedule shall include door and frame types, except referencing to door details and hardware sets. Window and louver schedules shall be complete including window and louver types except referencing to details.

1.6.1.8 Fire Ratings

Wall ratings, and fire hazards shall be clearly indicated as required by Fire Protection criteria. Wall fire ratings shall be graphically shown by a continuous symbol or pocheing within the wall on a Fire Protection /Life Safety Plan. When other functions coexist with the fire protection functions, their integration shall be clearly indicated, with an analysis that describes how both functions will be served. Provide a separate, floor plan which makes an accurate presentation of these various features and functions.

1.6.1.9 Drawing Scales

Architectural work shall be drawn at the scales listed below. Other scales may be used only by written authorization through the Technical Manager, Omaha District. Units of measurements shown on the drawings shall be done in millimeters. All disciplines should use the same scale for plan sheets. The following is a comparison guide to establish equivalent scaling of drawings:

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	METRIC
Composite Plans (Note 1)	Varies
Floor Plans	1:100
Reflected Ceiling Plans	1:100
Detail Plans (Note 2)	1:20
Roof Plans	1:100
Exterior Elevations	Same scale as plan
Interior Elevations	1:20
Interior Toilet Elevations	1:20
Building Cross Sections	1:100 or 1:50
Wall Sections (Note 3)	1:10
Stair Sections	1:20
Details (Note 2)	1:5
Wall Types	1:10
Fire Protection Plans (Note 1)	Varies

Notes:

- 1. Scale of composite plan shall be as required so that the entire facility is drawn on one sheet without break lines.
- 2. The goal of this requirement is that the details be large enough to show all fixtures, accessories, equipment, materials, manner of construction, clearances required for proper

maintenance, and complete dimensions. Toilet rooms and Equipment rooms are examples of the kind of spaces which shall be drawn as a Detail Plan.

1.6.1.10 Legends

Standard architectural material symbols used on the drawings shall be provided as a separate architectural legend drawing located just in front of the architectural drawings in the set. Additional material symbols should be added to the Legend Sheet as needed for the project.

1.6.1.11 North Arrows

North arrows shall be oriented the same direction on all plan sheets and by all disciplines; including site and civil drawings. Plan north shall be "up" or the left on the drawings. Indicate true north on composite plan drawings. North arrows shall be located approximately at the same location on all sheets.

1.6.1.12 Modular Design

Modular Design practices shall be followed in the design of all masonry buildings or components of buildings. Dimensions shall be figured to whole or half-unit lengths of standard units in order to reduce on-site cutting of masonry.

1.6.1.13 Symbols

The Room and Door Numbering system shall be consistent. The standard symbols for Amendments (a triangular box) or Modifications (a type of circular box, see the chapter on Drafting Criteria) to the contract shall not be used for any other purpose, and care must be taken to avoid using even similar appearing but technically different symbols. Room numbering shall start at the main entrance and proceed clockwise around functional areas.

1.6.1.14 Schedules

Schedules for room finish, doors, windows, louvers, etc., shall be clear and complete. As many columns as necessary should be provided in order to present the essential information. The "Remarks" column should not be used as a substitute for an information column. Normally a single item should be presented on each schedule line. Other scheduling methods as standard with the A-E may be used if approved by written authorization from the Project Architect, Omaha District.

1.6.1.15 Notes

Notes may be placed on drawings to reduce the amount of repetitive drafting, provided that clarity is not lost. General notes should be placed at the right-hand edge of the sheet and, if possible, should be located on the first sheet in the set. Notes that pertain to each drawing however, should be placed on each drawing.

1.5.1.18 Dimensions

Dimensions must be complete, accurate and fully coordinated. Dimensions should be to points easily measurable in the construction, and should be laid out to eliminate refiguring in the field. Dimensions should be

tied-in to column lines, etc., to facilitate checking. Plan dimensions for frame construction should be to face of stud (or sheathing) for exterior walls, to one face of stud for interior partitions, and to centerline of openings. For masonry construction, dimensions should be to one or both nominal faces of masonry and to jambs of openings.

1.6.1.16 Access to Utilities

All utilities within the building, such as piping, ductwork, electrical work, etc., shall be concealed in finished areas. Provide plumbing chases in toilet areas. The clear space above ceilings and the size of chases must be carefully figured to accommodate piping slopes and connections, ductwork crossovers, and similar situations. Access must be provided to valves, cleanouts, etc. Space provided for utilities systems must be adequate but should not be excessive.

1.6.1.17 Reflected Ceiling Plans

Reflected Ceiling Plans shall be provided for all spaces in the building. Reflected ceiling plans shall show the ceiling tile layout and location of gypsum wallboard and other ceiling types where applicable. All light fixtures, air diffusers, grilles, registers, PA speakers, sprinkler head layout, smoke and heat detectors - if ceiling mounted, and other ceiling mounted items will also be shown on the reflected ceiling plans. The fixtures and other equipment shall be laid out in a regular pattern symmetrical with the ceiling tile grid, or symmetrical with the room centerlines, columns, windows, or other feature that dominates. All ceiling mounted items shown shall be fully coordinated with all other disciplines.

1.6.1.18 Sketches

All sketches presented during the design phase shall be reduced to 8-1/2" by 11" and included in this design analysis to document the design options and decisions evaluated during the design process.

1.6.2 Technical Specifications

1.6.2.1 Use of Technical Guide Specifications

Technical Unified Federal Guide Specifications (UFGS) shall be used to achieve the maximum uniformity in contract requirements. The technical guide specifications describe the type and quality of material and installation normally acceptable for Corps construction, and often represent specific agreement between the Corps and the applicable industry. The provisions of the technical guide specifications should not be changed without justification. The 60% submittal shall include a draft edited specifications of all the applicable sections. Items added or deleted in these specification sections shall be evident. Complete descriptions including specific size, gauge, and configuration are included in the technical Guide Specifications for a wide variety of items. The designer must be familiar with the technical Guide Specification requirements in order to provide details fully coordinated with the technical specification descriptions. Terminology used on the drawings shall be the same as used in the Technical Guide Specifications. Where it is desirable to detail a variance with the standard provisions of the Technical Guide Specifications, the specifications must be revised to coordinate with the details. In addition to the guidance in specification Section 01332,

SUBMITTAL PROCEDURES FOR CONSTRUCTION on editing technical specifications, data and sample submittals for all interior and exterior finishes shall be "G" submittals.

a. New Guide Specifications

New guide specifications shall be limited to those specialty type items not covered in the regular sections of Technical Guide Specifications or provided as a requirement listed in the various CSI divisions within this document.

1.6.3 Design Analysis Narrative

The Design Analysis shall be essentially complete with emphasis on the following:

1.6.3.1 Basic Criteria Statement

A statement indicating the basic criteria to be applied to the design including type of construction (noncombustible, etc.), category of construction (permanent, etc.), major fire protection and exit requirements, etc..

1.6.3.2 Description of Materials

A description of materials for all major building components and of all interior and exterior finishes ascertaining their matching of existing. The description of materials must include type of exterior wall construction, room finish schedule, window types, panel materials, etc. The description of materials should follow the continuity of the Military Handbook 1190. The description of finishes may be presented in schedule form.

1.6.3.3 General Parameters

The design analysis shall follow the format described herein.

- a. The purposes, overall functions, and total capacities of the facility.
- **b.** The design theme or visual appearance of the exterior and interiors of the building, and how this facility coordinates with the image criteria of the installation on which it will be constructed.
- c. The number of personnel to use facility.
- d. The type of activities and equipment involved.
- e. The anticipated life of the functions to be accommodated.
- f. The category of construction; permanent

1.6.3.4 Functional and Technical Requirements

a. Functional areas, occupant capacities, and allocation, including a functional relationship matrix.

- b. All items of equipment, required.
- c. Occupational safety and health.
- e. Energy conservation energy budget goals.
- f. Sound and vibration control.
- q. Interior service areas.
- h. Physical security; lock and keying, intrusion-detection, alarms, restricted access areas, interior guard support, and ties to local authorities.
- ${f i.}$ Justification for selection of exterior and interior finishes and materials.
- j. Moisture Vapor Control.
- k. Lessons learned incorporated into the design.
- 1.6.3.5 Design Objectives and Provisions
 - **a.** Adaptation of the building to the size, shape, and orientation of the site.
 - **b.** Building layout to establish convenient circulation flows during normal operation and emergency evacuation activities, for materials, equipment, services, and people.
 - ${\tt c.}$ Grouping spaces into sound-compatible zones and protective construction zones, e.g., for fire and storm.
 - **d.** Space layout compatible with modular (structural and environmental) support systems.
 - e. Type of construction materials, architectural systems, and finishes.
 - f. Building expandability/changeability.
 - g. Physical security.
 - i. Energy conservation. (insulation, orientation)
 - j. Acoustical design.
 - k. Moisture vapor condensation design.
 - 1. Composition of masses and spaces architectural compatibility and architectural details to reflect the design theme and desired image, and the scale and nature of the activities involved.
 - m. Perception of the building details and volumes. (Specific provisions made, e.g., an identifiable sequence of viewing positions for experiencing the interior and exterior architectural design.)
 - n. Enhancement of materials and systems maintenance and operation.
 - o. Economy of building construction, operation, and maintenance: life-cycle

cost effectiveness.

- 1.6.3.6 Coordination with Installation or Outside Agencies
 - a. Physical security support.
 - **b.** Occupational safety and health, as required.
 - c. Government furnished equipment.
 - d. Operations and maintenance support.

1.6.3.7 Checklists

Fire Protection Code Analysis shall be included in the Design Analysis. See Attachments Code Analysis and ADA Architectural Design Checklist at the end of this section.

- 1.6.4 Design Analysis Calculations
 - a. Net room areas, occupant capacity and gross building areas.

(Categorize areas and capacities under the titles of "Operational Space Requirements", "Administrative Space Requirements", "Storage Space Requirements", and "Support Space Requirements".)

- b. U-values for each wall, window, door, or roof type studied or selected.
- c. Acoustics.
- d. Rainfall intensity relative to roof area and roof drain size and number calculations.
- e. Sustainable Design. The Design Analysis shall include the proposed sustainable design objectives with reference to building design and construction work which will be attained as part of this project.

1.7 INTERIORS

1.7.1 Design Analysis/Narrative

A section for interior design shall be included in the design analysis. This section shall include:

- A. A detailed explanation of the desired image or visual appearance of the interior of the facility and the design intent.
- B. Description and rationale for finish materials used, their performance characteristics, durability, maintenance requirements, and other pertinent data.
- B. Life cycle analysis of materials with high initial cost such as solid surfacing material.
- C. Acoustical calculations and data supporting the noise-reduction

materials used in the atrium and multi-purpose rooms.

- D. Manufacturer cut sheets for all kitchen equipment.
- E. Sustainable Design. The Design Analysis shall include the proposed sustainable design objectives with reference to interior finishes and design which will be attained as part of this project.

1.7.2 Technical Specifications

Provide a complete listing of all specification sections which will be provided in this project to include all contractor-edited and government-edited specifications listed in specification Section 01014, INTERIOR DESIGN.

1.7.3 Color Boards

Preliminary architecural (AE) design color boards shall be supplied in the format described in government specification Section 09920, CONTRACTOR COLOR BOARDS, paragraphs 2.1 and 3.1. The color boards shall show actual color samples of all proposed exterior and interior finishes. Samples shall be identified by a universal symbol that is used to describe the material on the color boards and drawings for cross reference purposes. A copy of the Interior Finish Schedule and Interior Finish Materials Legend shall accompany the color boards to aid in clearly identifying all finishes. Clarification of finish placement shall be required when more than one color of a single finish is proposed. A minimum of two sets shall be supplied to the government.

1.7.4 Drawings

Sixty percent architectural drawing submittal shall be a complete set of architectural drawings meeting the requirements regarding dimensioning, scales, and formatting as described in paragraph 1.5.1 of this specification. For interior design purposes the drawings shall include:

1.7.4.1 Floor Plans

The overall and expanded floor plans shall locate and show the following scaled items:

- A. Plumbing fixtures.
- B. Kitchen equipment.
- C. Cabinets, counters, and casegoods.

1.7.4.2 Interior Elevations

Fully dimensioned interior elevations shall be provided of all walls or partial wall areas required to visually and dimensionally locate interior architectural materials, finishes, cabinetry, or equipment. Interior elevations shall include symbology for required detail cross sections.

1.7.4.3 Schedules and Legends

Provide a fully edited finish schedule in the COE format provided. Provide a 60 percent complete Interior Finish Materials Legend in the COE format provided.

1.7.4.4 Sub Title

Provide a preliminary scaled furniture and equipment floor plan coded to show and differentiate between both contractor and government supplied equipment and furnishings. Government supplied furnishings and equipment shall be shown in typical (estimated) sizes and configurations to illustrate adequate space and circulation space has been provided.

1.8 STRUCTURAL

1.8.1 DRAWINGS

Drawings shall include roof framing plans, floor slab plans and foundation plans for buildings. Roof framing plans shall show sufficient details to clearly indicate the type of framing system used, size and spacing of members and their elevations. The location of all columns or pilasters shall be shown, and all building structural members shall be at least outlined. The sizes, locations and elevations of footings shall be shown. Slab plans shall be coordinated with the Architectural sheets and shall indicate the locations of structural walls and masonry partitions, recessed slabs and contraction or construction joints. Concrete slab-on-grade thicknesses and sections shall be shown. Proposed treatment of unique or complex features and details shall be shown on the drawings. Elevation views, sections and details necessary to illustrate the design at a 60% level of completion shall be provided. Drawings shall also include overall building plan dimensions, north arrows, and design notes. Drawings shall be done at a scale appropriate for the design, in no case however, shall plan type drawings be done at a scale smaller than 1:100 or detail type drawings at a scale smaller than 1:20.

1.8.2 SPECIFICATIONS

For this 60% design submittal the Contractor shall provide a listing by title and number of all Technical Specifications proposed for use in the final structural design.

1.8.3 DESIGN ANALYSIS NARRATIVE

The design analysis shall include all items included in the 35% submittal expanded as necessary to reflect the current stage of the project and any revisions necessitated by comments on the Concept submittal. Design analysis shall follow the format described in Section 01331 SUBMITTALS DURING DESIGN, Paragraph 3.3, "Design Analyses" and the specific content shall be essentially as outlined below.

1.8.3.1 Design Criteria and References

A list of design criteria references, such as Department of the Air Force Manuals, Army Corps of Engineers Technical Instructions, ACI Standards, AISC Specifications, etc., and any other references which were used in the design of the project shall be included in the narrative.

1.8.3.2 Design Loads and Conditions

A list of structural design loads and conditions shall be provided, including:

- Snow load parameters;

- Wind load parameters
- Seismic design parameters;
- Roof live loads;
- Floor live loads, identifying each loading with usage and the room or space where used;
- Foundation design criteria, including the design depth for footings, allowable soil bearing pressure, equivalent fluid densities (or lateral earth pressure coefficients) for the design of earth retaining structures and building components, modulus of subgrade reaction, and any other pertinent data derived from the recommendations of the Final Foundation Analysis report (See Attachment No. 2 included as an appendix to this solicitation), a copy of which shall be included as an Appendix to the design analysis.

1.8.3.3 Structural Materials

A list of structural materials shall be provided, together with the stress grades and/or ASTM designations, as applicable, for structural steel, concrete, and reinforcing steel; the series for steel joists; and identification of the proposed use of each material in the structure.

1.8.3.4 Availability of Precast Concrete Units

Where precast concrete units of particular cross section(s) and concrete strength are a part of the structural design, verification of their availability from precast producers in the project vicinity shall be documented. Acceptable documentation consists of letters from the producers or a written statement by the Contractor identifying the name and address of the precaster(s), description of units and concrete strength(s) available, date when availability was verified, and name of Contractor's staff member who obtained the verification.

1.8.3.5 Description of the Structural System

A concise description of the proposed structural systems selected for the building, together with the reasons for its selection, shall be provided. All principal elements of the structural system selected shall be described. Typically, these shall include:

- Primary supporting members for the roof;
- Masonry walls, type of material, and whether load bearing or non-load bearing, with location of load-bearing walls defined, and measures taken to compensate for expansion/contraction and crack control in masonry walls;
- The proposed system for resisting lateral forces (wind and earthquake) and transferring them to the ground, whether diaphragms, chord bracing, shear walls, braced or moment resisting frame, etc;
- Foundations, description of special designs to accommodate existing site conditions;
- Concrete slab-on-grade floors, description of floor surface finish treatment, accommodation of live loads, and the use, location and types of crack control joints;
- The proposed treatment of any unusual structural loadings, features or unique solutions to structural problems.
- Identification of any major vibrating elements and measures taken to isolate them.

1.8.4 DESIGN ANALYSIS CALCULATIONS

The extent of the structural calculations shall be indicative of a design which has reached a 60% level of completion. Computations shall include the determination of snow, wind, seismic, dead and live loads. Computations shall show sizing and spacing of structural members for roof framing, sidewalls and foundation sizes, as appropriate to the systems to be used for these elements.

1.9 MECHANICAL

Compliance with the design requirements for the building mechanical systems will be determined by a review of the submitted 60 percent design analysis, design calculations, drawings and specifications. The 60 percent design submittal shall include all the information presented in the 35 percent submittal, updated to 60 percent design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any conflicts in the design requirements or lack of thorough understanding of the nature and scope of work shall be identified and resolved prior to submittal of the 60 percent design.

1.9.1 DESIGN ANALYSIS NARRATIVE

The 60 Percent Design Analysis Narrative shall include the information presented in the 35 percent submittal and as specified in Section 01019, 35 PERCENT DESIGN REQUIREMENTS. The information shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the 60 percent design.

1.9.2 CALCULATIONS

The 60 percent calculations shall include all the information presented in the 35 percent submittal and as specified in Section 01019, 35 PERCENT DESIGN REQUIREMENTS, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the 60 percent design. The design analysis calculations shall include the heating, cooling, and ventilation load calculations to determine the selection of the type and size of mechanical equipment to be used. Design calculations shall be provided in sufficient detail to enable the reviewer to get a clear understanding of all work to allow approval. Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials, performance of specific systems or equipment. Manufacturer's catalog data sheets shall be provided for each item of equipment selected. Calculations shall be performed by computerized procedures as specified in Section 01016, MECHANICAL REQUIREMENTS. Use of standardized charts, curves, tables, graphs shall not be acceptable for portions of required calculations in lieu of specific calculation procedures, except when the charts, curves, tables, and/or graphs are part of the manufactures' proprietary published selection procedure/data to determine the output capacity, pressure drops, etc of the equipment being selected. Design calculations and computations shall be provided for all systems and shall include, but not limited to, the following:

1.9.2.1 Block Air-Conditioning Loads

Preliminary block load calculations as specified in Section 01016, MECHANICAL REQUIREMENTS for boiler, chiller and fluid cooler selection. A copy of all input and output printouts for all three design conditions shall be provided.

1.9.2.2 Chiller Selection

Include chiller capacity adjustments for altitude, inefficiency, and net rating. Provide catalog data indicating input, output and ambient temperatures, input capacity, net output capacity, electrical data, dimensions, and water size connections.

1.9.2.3 Fluid Cooler Selection

Include fluid cooler capacity adjustments for altitude, inefficiency, and net rating. Provide catalog data indicating input, output and ambient temperatures, capacity, electrical data, dimensions, and water size connections.

1.9.2.4 Boiler Selection

Include boiler capacity adjustments for altitude, inefficiency, and net rating. Provide catalog data indicating input capacity, net output capacity, number of modules, dimensions, and water and intake and exhaust size connections.

1.9.2.5 Combustion-Air Requirements

Include combustion air quantity and free area calculations for all indirectly vented gas burning appliances, louver selection, combustion air heating requirements, and selection of heating equipment.

1.9.2.6 Air Handling Units

Air handling unit selection including selection of all filters, mixing boxes, access sections, fan section, coils and coil sections in accordace with the manufacturer's published selection procedures and/or the manufacturer's selection software. Provide catalog data indicating flow rate volumes, coil capacity and water flow rates, number of modules, dimensions and connection sizes. All selections shall be relatively final except for the fan sizing.

1.9.2.7 Blower Coil Units

Blower coil unit selection including selection of all filters, access sections, fan section, coils and coil sections in accordace with the manufacturer's published selection procedures and/or the manufacturer's selection software. Provide catalog data indicating flow rate volumes, coil capacity and water flow rates, dimensions and connection sizes. All selections shall be relatively final except for the fan sizing.

1.9.2.8 Computer or Fan Coil Unit

Selection of the unit for the communication rooms including selection of all filters, access sections, fan section, heating coil and DX coil in accordace with the manufacturer's published selection procedures and/or the manufacturer's selection software. Provide catalog data indicating flow rates, coil capacity, dimensions and connection sizes. All selections shall be relatively final except for the fan sizing.

1.9.2.9 Make Up Air Unit

Make up air unit selection including selection of all filters, access

sections, fan section, coils and coil sections in accordace with the manufacturer's published selection procedures and/or the manufacturer's selection software. Provide catalog data indicating flow rate volumes, coil capacity and water flow rates, dimensions and connection sizes. All selections shall be relatively final except for the fan sizing.

1.9.2.10 Unit Heater Selections

For each area requiring a unit heater, provide data on capacity, flow rates, pressure drops, weight, and horsepower.

1.9.2.11 Waste and Vent Pipe Sizes

Provide preliminary riser diagrams with fixture type, fixture units and resultant pipe sizes.

1.9.2.12 Domestic Water Demand

Calculations for determining the size of the domestic cold water supply line to the building shall be provided.

1.9.2.13 Domestic Pipe Sizes

Provide preliminary riser diagrams with fixture type, fixture units and resultant pipe sizes. In addition to the pipe sizes provide a summary of the pressure drops and available pressure from the service enterance to the most hydralicly remote fixture that demostrates the pressure required by the fixture is meet.

1.9.2.14 Domestic Hot Water Demand

The design guidance provided for service water heating in ASHRAE Handbook HVAC Systems and Applications shall be followed to determine the domestic hot water demand for the facility as specified in Section 01016, MECHANICAL REQUIREMENT. Provide calculations and catalog data for the domestic water heaters and storage tanks.

1.9.2.15 Pipe Sizes for Internal Roof Drains

If any internal roof drains are provided, than provide preliminary riser diagrams with drain type, estimated flow and resultant pipe sizes as specified in Section 01016, MECHANICAL REQUIREMENT.

1.9.2.16 Natural Gas Pipe Sizes

Provide preliminary riser diagrams with appliance type, input rating and resultant pipe sizes as specified in NFPA 54 and section 01016, MECHANICAL REQUIREMENT.

1.9.2.17 Hydraulic Calculations for Fire Protection

Hydraulic calculations for the wet pipe sprinkler system, including a drawing showing hydraulic reference points and pipe segments.

1.9.2.18 Load Calculations for Sizing Sway Bracing

For wet pipe sprinkler systems that are required to be protected against damage from earthquakes, load calculations shall be provided for sizing of sway bracing.

1.9.2.19 Estimated Preliminary Calculations

Segment by segment calculations of pressure drop for piping and ductwork need not be submitted at the stage except for items to be Fast Tracked. Any additional preliminary calculations shall be provided to estimate pressure drop in pump and fan selections, pipe and duct sizes and expansion tank sizing shall be submitted for review.

1.9.2.20 Electrical Load Summary

A summary of all mechanical equipment and the associated electrical load requirements shall be provided.

1.9.2.21 Mechanical Items to be Fast Tracked

All final calculations as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every piece of mechanical, HVAC and/or plumbing equipment to be installed before the full facility design is complete and approved prior to the installation of the subject item.

1.9.2.22 Site, Architectural and Structural Items to be Fast Tracked

Pior to the installation of any structural foundations the size of the mechanical room shall be verified and all piping to be installed below the slab on grade floor shall be fully designed and approved as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS. All final calculations as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements, including all maintenance clearances, for every piece of mechanical, HVAC and/or plumbing equipment to be installed within the foot print of the mechanical room and all piping to be installed below the slab on grade floor. When grading or building surface is to be fast tracked, than all final calculations as specified above, in section 01020, 60 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every mechanical, HVAC and/or plumbing distribution system that penitrates the installed grading or surface prior to the installation of the subject grading or surface.

1.9.3 CONSTRUCTION DRAWINGS

The drawings shall be fully coordinated with the design analysis and specifications. Provide sufficient plans, piping diagrams and isometrics, sections, air and water flow diagrams, details, schedules, and control diagrams/sequences of operation etc. shall be provided as necessary to define the required design intent and requirements. The designer shall show on the construction drawings all items which are referred to with phrases such as "as shown", "as indicated", "as detailed", etc within the UFGS Specifications. The construction drawings shall show, to scale, the actual equipment to be installed and all required clearances required for operation, routine maintenance, and replacement of minor and major

components. The drawings shall not show any piping, ductwork or other mechanical equipment to be exposed in finished spaces except where approved by the government. All exposed items shall be called out to the government for approval before proceeding. Access panels required for concealed items shall be shown on the construction drawings. The design and installation shall be fully coordinated with all other trades involved in the design and construction of the facility. Special care shall be given to National Electric Code requirements for clearance in front of and above electrical equipment. The construction drawing shall be produced to incorporate the requirements below into all drawings. Furthermore, the requirements below shall be repeated in the form of general notes on every mechanical (both HVAC and plumbing) construction drawing that shows a plan view. General notes shall include any mechanical general installation notes that may be required to clarify the construction intent that may not be readily apparent in the specifications or on the drawings. General notes may be provided on a separate sheet if space does not exist on the plan sheets. Sheet reference number sequencing shall be in accordance with the A/E/CCADD Standards Manual, ERDC/ITL TR-01-6. Submittal drawings shall include, but not limited to, the following:

1.9.3.1 Drawing Clarity

All drawings specified below, when reproduced at half scale, shall be clear and easily readable as determined by the Contracting Officer's Representative (COR).

1.9.3.2 Drawing Coordination

Show on all mechanical drawings specified below, all items of mechanical equipment and systems, to determine proper space allocation within the limits of the architectural, structural and electrical layout requirements. Plans, elevations, and sections shall be developed sufficiently to insure that major equipment items, piping, and ductwork cause no interference with architectural members, structural members, electrical equipment, etc.

1.9.3.3 Index Sheet

An index sheet identifying all mechanical drawings shall be provided, including those drawings anticipated to be provided in the 100 percent design submittal. Index shall include drawing design file numbers, drawing numbers, sheet numbers, and drawing descriptions.

1.9.3.4 Legend Sheet

This sheet shall include all mechanical abbreviations and symbols that will be used on the drawings. Symbols shall be grouped into sections; as a minimum, provide sections for Plumbing, Heating, Miscellaneous Piping, Valves and Fittings, and ventilation.

1.9.3.5 Plumbing Plan Sheets

Floor plans shall use the architectural floor plans as a basis, with the building outline half-toned. Unless otherwise indicated, all floor plans shall be drawn at 1:50 scale and shall show all room names and numbers. Coordinate with architectural design for provisions of access panels for all concealed valves, traps, fire dampers and air vents etc.. Coordinate with architectural design so that louvers shown on architectural drawings match damper sizes for the respective openings as shown on Mechanical drawings. An exception to this are mechanical room plans shall be 1:20

scale.

Plumbing plans showing the design and tentative layout of the domestic hot and cold water distribution systems; make-up water piping; soil, waste and vent piping; and storm water drainage system shall be provided. Plans shall show all anticipated routing of piping systems from the connections within the structure to a point 1.5 meters outside the structure. The grade of all drain lines shall be calculated and invert elevations established. All electrical panels/equipment and pertinent HVAC equipment (expansion tanks, boilers, AHU's, pumps, etc.) shall be outlined in half-tone on the plumbing plans. Plumbing fixtures and drains shown on the drawings shall be designated by the same identification system used in the Technical Specification and Plumbing Fixture Schedule.

1.9.3.6 Enlarged Mechanical Room Plumbing Plan

An enlarged mechanical room plumbing plan drawn at a minimum 1:20 scale shall be provided. Plan shall show layout of all plumbing equipment and piping within the rooms. Mechanical room piping, ductwork and equipment shall be installed to provide a minimum headroom of 2 m below all overhead mechanical room piping, ductwork and equipment. Aluminum jackets shall be provided over all insulation installed within 1500 mm of the mechanical room floor. In addition to all the plumbing systems required, the plan shall show half-toned outlines of all HVAC equipment located in the room, gas service, the fire protection entrance and risers, and the outline of any electrical panels or equipment located in the room.

1.9.3.7 Enlarged Kitchen Plumbing Plan

An enlarged Kitchen plan drawn at a minimum of 1:20 scale shall be provided. Plan shall show layout of all plumbing equipment and piping within the rooms. In addition to all the plumbing required, the plan shall show half-toned outlines of all HVAC equipment located in the room, gas service the fire protection and the outline of any electrical panels or equipment located in the rooms.

1.9.3.8 Plumbing Detail Sheets

Installation details showing all specification requirements such as isolation and balancing valves, thermometers, pressure gauges, equipment pads, strainers, vents, hangers, vibration isolation, etc. shall be provided for each item of plumbing equipment. Details shall be provided in the construction drawings for each piece of equipment such as pumps, water heaters, water service entrance, and other similar items. Details shall clearly shown all requirements specified in this section and the Technical Specifications.

1.9.3.9 Plumbing Schedule Sheet

Schedules, with preliminary capacities, shall be provided for each item of plumbing equipment. At a minimum, a plumbing fixture schedule and a water heater schedule shall be provided.

1.9.3.10 Plumbing Riser Sheet

Plumbing Riser Diagrams showing all fixtures, water, waste, and vent piping shall be provided for the mechanical equipment room, kitchen, laundry and each toilet area including janitor's closet.

1.9.3.11 Enlarged Mechanical Equipment Yard Plan

An enlarged mechanical equipment yard plan drawn at a minimum of 1:20 scale shall be provided. Plan shall show layout of all mechanical equipment and piping within the space. In addition to all the mechanical required, the plan shall show half-toned outlines of all electrical panels or equipment located in the space.

1.9.3.12 HVAC Plan Sheets

Floor plans shall use the architectural floor plans as a basis, with the building outline half-toned. Unless otherwise indicated, all floor plans shall be drawn at 1:50 scale and shall show all room names and numbers. Coordinate with architectural design for provisions of access panels for all concealed valves, traps, fire dampers and air vents etc.. Coordinate with architectural design so that louvers shown on architectural drawings match damper sizes for the respective openings as shown on Mechanical drawings. An exception to this are mechanical room plans shall be 1:20 scale.

Mechanical HVAC plans showing the design and tentative layout of the hot water piping distribution system and equipment, the chilled water piping distribution system and equipment, the air supply and distribution systems and equipment, and the ventilation and exhaust systems and equipment shall be provided. Air supply and distribution systems shall show all ductwork, including supply and return ductwork, ductwork to diffusers, and all diffusers. Use of flexible ductwork shall be limited to a maximum length of $2\ \mathrm{m}$. Where ductwork must be offset to cross another duct, the duct with the lowest velocity shall be offset. Ductwork offsets shall not be greater than 30 degrees unless the designer has shown the offset and included it in the duct systems calculations. The designer shall indicate the duct pressure classification for each duct segment on the construction drawings. All ductwork shall be sealed to seal class A. For the 60 percent submittal, all ductwork may be shown as single-lined. The final design submittal shall show all ductwork as double-lined. All electrical panels/equipment and pertinent plumbing equipment shall be outlined in half-tone on the HVAC plans.

1.9.3.13 Mechanical Sections

For each air handling unit and for congested areas where the proximity of mechanical, HVAC, plumbing and electrical items, equipment and/or distribution system require vertical spatial definition, a mechanical section view shall be provided showing, but not limited to, all AHU or other equipment components, ductwork and piping connections/routing, and relationship to adjacent architectural, structural and electrical features.

1.9.3.14 Enlarged Mechanical Room HVAC Plan

An enlarged mechanical room HVAC plan drawn at a minimum 1:20 scale shall be provided. Plan shall show layout of all mechanical systems, HVAC equipment, piping, and ducts within the rooms. Equipment shall include (but not limited to) air handling units with associated outside air intakes, relief air, and supply/return ducts; exhaust/supply fans, mechanical room ventilation intake/relief openings, gas service entrance, combustion air opening (if required), unit heaters, HW pumps, CW pumps, boilers, air separators, expansion tanks, water treatment and temperature control panels. Openings for relief air and outside air shall be coordinated with size of architectural louver. Plans shall show dedicated

access space for items requiring maintenance. Mechanical room piping, ductwork and equipment shall be installed to provide a minimum headroom of 2 m below all overhead mechanical room piping, ductwork and equipment. Aluminum jackets shall be provided over all insulation installed within 1500 mm of the mechanical room floor. In addition to all the HVAC systems required, the plan shall show half-toned outlines of all plumbing equipment located in the room, gas service, the fire protection entrance and risers, the water service entrance, and the outline of any electrical panels or equipment located in the room.

1.9.3.15 Enlarged Kitchen HVAC Plan

Enlarged Kitchen plans showing all mechanical systems and drawn at a minimum 1:20 scale shall be provided. Plans shall show layout of all equipment, piping, and ducts located within the rooms. Equipment shall include (but not be limited to) air handling units with associated outside air intakes, relief air, and supply/return ducts; exhaust/supply fans, condensate hoods and grease hoods. Plans shall show dedicated access space for items requiring maintenance. In addition to all the mechanical HVAC systems required, the plan shall show half-toned outlines of all major plumbing equipment, and any electrical equipment or panels located in the room.

1.9.3.16 Mechanical Detail Sheets

Installation details showing all specification requirements such as isolation and balancing valves, thermometers, pressure gauges, equipment pads, strainers, vents, hangers, vibration isolation, etc. shall be provided in the construction drawings for each piece of equipment such as pumps, air handling units, heating or cooling coils, in-line fans, propeller fans, exhaust hoods, relief hoods or penitrations, unit heaters, expansion tanks, chemical shot feeders, boilers, chillers, fluid coolers, and other similar items. Pressure gauges shall be installed on each side of each piece of equipment such as pumps, heating or cooling coils, boilers, chillers, fluid coolers, and other similar items. Pressure gauges located on the return side of coils shall be located between the coil and the control valve. Thermometers shall be installed on each side of each piece of equipment such as heating or cooling coils, boilers, chillers, fluid coolers, and other similar items. Thermometers in horizontal lines shall be installed with stems horizontal or above. Thermometers located on the return side of coils shall be located between the coil and the control valve. Details shall clearly shown all requirements specified in either in this section or the Technical Specifications.

1.9.3.17 Mechanical Schedule Sheets

Schedules, with equipment type, sizes, dimensions, capacities (both input and output), all velocities, all pressure drops, all input and output temperatures, all volume flow rates, rotational speed, efficiencies, noise criteria and electrical data as a minimum shall be provided for each item of mechanical equipment. Preliminary schedules shall be revised and completed as necessary to suit the project requirements.

1.9.3.18 Combined Enlarged Mechanical Plan

Where seperate plans have been specificed above for the plumbing, HVAC and other mechanical requirements with the other disciplines specified to be shown half-toned, a single combined plan maybe provided if all other requirements specified above are meet including drawing clarity. The plan

shall show half-toned outlines of all major architectural, structural and electrical items and clearances located in the room.

1.9.3.19 Wet Pipe Sprinkler System Drawings

The Sprinkler System Shop Drawings shall conform to the requirements established for working plans as prescribed in NFPA 13. Drawings shall include plan and elevation views demonstrating that the equipment will fit the allotted spaces with clearance for installation and maintenance.

- a. Floor plans drawn to a scale not less than 1:100 which clearly show locations of sprinklers, risers, pipe hangers, seismic separation assemblies, sway bracing, inspector's test connections, drains, and other applicable details necessary to clearly describe the proposed arrangement. Each type of fitting used and the locations of bushings, reducing couplings, and welded joints shall be indicated.
- b. Actual center-to-center dimensions between sprinklers on branch lines and between branch lines; from end sprinklers to adjacent walls; from walls to branch lines; from sprinkler feed mains, cross-mains and branch lines to finished floor and roof or ceiling. A detail shall show the dimension from the sprinkler and sprinkler deflector to the ceiling in finished areas.
- c. Longitudinal and transverse building sections showing typical branch line and cross-main pipe routing as well as elevation of each typical sprinkler above finished floor.
- d. Details of each type of riser assembly; pipe hanger; sway bracing for earthquake protection, and restraint of underground water main at point-of-entry into the building, and electrical devices and interconnecting wiring.

1.9.3.20 Mechanical Items to be Fast Tracked

All final drawings including fully edited and coordinated control drawings as specified above, in section 01019, 35 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in TI 810-11 shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every piece of mechanical, HVAC and/or plumbing system, equipment and the final control requirements for every piece of HVAC equipment to be installed before the full facility design is complete and approved prior to the installation of the subject item.

1.9.3.21 Site, Architectural and Structural Items to be Fast Tracked

Pior to the installation of any structural foundations the size of the mechanical room shall be verified and all piping to be installed below the slab on grade floor shall be fully designed and approved as specified above, in section 01019, 35 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS. All final drawings as specified above, in section 01019, 35 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements, including all maintenance clearances, for every piece of mechanical, HVAC and/or plumbing equipment to be installed within the foot print of the mechanical room and below the slab on grade floor. When

grading or building surface is to be fast tracked, than all final drawings as specified above, in section 01019, 35 PERCENT DESIGN REQUIREMENTS, in section 01021, 100 PERCENT DESIGN REQUIREMENTS and in section 01016, MECHANICAL REQUIREMENTS shall be submitted, reviewed and approved to accurately and clearly identify the final requirements for every mechanical, HVAC and/or plumbing distribution system that penitrates the installed grading or surface prior to the installation of the subject grading or surface.

1.9.4 SPECIFICATIONS

The submitted 35 percent technical guide specifications shall be updated, completely edited, and fully coordinated with the drawings to accurately and clearly identify the 60 percent product and installation requirements for the facility. Technical specifications shall be Unified Facilities Guide Specifications (UFGS), which shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility as specified in Section 15000, DIVISION 15: MECHANICAL - OUTLINE SPECIFICATIONS. specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. All UFGS specification indexes shall be completely edited to reflect the paragraphs retained in the body of the technical specification. All references that have not been used in the body of the technical specification shall be edited from the UFGS specification. Technical specifications shall be coordinated with the plans and include all items contained within the project. Provide special sections to cover those subjects for which no UFGS guide specification is available. Specific items of equipment identified in the UFGS specifications but not required for the facility shall be edited out. All edited UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added. Government conformance review is required for any specification addition or deletion.

1.9.4.1 Items to be Fast Tracked

Fully edited and coordinated technical guide specifications as specified above and in Section 15000, DIVISION 15: MECHANICAL - OUTLINE SPECIFICATIONS shall be submitted, reviewed and approved to accurately and clearly identify the final product and installation requirements for every item to be installed before the design is complete and approved prior to the installation of the subject item.

1.10 ELECTRICAL

1.10.1 Drawings

Drawing scale shall match architectural drawing requirements. Drawings shall show the following:

1.10.1.1 Lighting Layout and List of Fixtures

Complete lighting layout of all areas shall be provided. The type of fixture shall be indicated on the drawing. Complete list of fixtures proposed with type of lamp and wattage.

1.10.1.2 Receptacle Layout

Complete receptacle layout should be provided for all areas to indicate project requirements.

1.10.1.3 Power Equipment and Layout

Power equipment and layout such as switchgear, panelboards, large motor driven items, etc.

1.10.1.4 Power One Line Diagram

Power one line diagram shall be shown to indicate arrangement of the system.

1.10.1.5 Communications

Communications (telephone, public address) shall be shown sufficiently to indicate the designers understanding of the Section 01007 ELECTRICAL REOUIREMENTS.

1.10.1.6 Fire Detection

Fire Detection drawings shall be provided and inserted in the Fire Protection/Fire Suppression F-Series of drawings.

1.10.1.7 Miscellaneous Details of Special Equipment

Miscellaneous details of special equipment to indicate understanding of 01007 ELECTRICAL REQUIREMENTS.

1.10.2 Specifications

Submit prescriptive specification sections to specify the quality, characteristics, installation procedures and testing requirements for all items of the proposed electrical design.

Specifications shall be provided (to approximately 60 percent completion). See Section 01332 SUBMITTALS DURING DESIGN, paragraph 3.2, SPECIFICATIONS for additional requirements.

1.10.3 Design Analysis Narrative

The design analysis shall contain a description and analysis of the electrical portions of the design. Special features, unusual requirements, etc., should be noted. Narrative must address all technical requirements identified in Section 01007 ELECTRICAL REQUIREMENTS.

1.10.4 Design Analysis Calculations

Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials. As a minimum the following shall be submitted.

1.10.4.1 Service

Sizing of building services EMD (Estimated Maximum Demand) for all the building loads.

1.10.4.2 Transformers

Sizing of general purpose dry type transformers.

1.10.4.3 Feeders

Sizing of main feeders.

1.10.4.4 Panelboards

Sizing of panelboards and distribution equipment.

1.10.4.5 Illumination Calculations

Data should identify target and calculated illumination levels for all typical rooms. Calculations should be adjusted to compensate for special applications such as irregularly shaped rooms, open sides, ceiling obstructions (beams, ductwork), corridors, etc. If the lumen method is used for corridor calculations, the calculations should be performed using a module in which the length doesn't exceed 3 times the width (2:1 ratio preferred).

1.10.4.6 Short Circuit Evaluation

The maximum possible fault current at the building service should be calculated.

1.10.4.7 Sustainable Design

The Design Analysis shall include the proposed sustainable design objectives with reference to electrical sytems, equipment, lighting, and design work which will be attained as part of this project.

1.11 FIRE PROTECTION

1.11.1 DRAWINGS

Features of Fire Protection, their ratings, and the hazards requiring them, shall be clearly indicated. Sprinkler and fire alarm/detection areas shall also be clearly indicated. Fire detection and sprinkler systems shall be laid out and detailed sufficiently to indicate the designers understanding of the Section 01008 FIRE PROTECTION REQUIREMENTS. When other functions co-exist with the fire protection functions, their integration shall be clearly indicated, with an analysis that describes how both functions will be served. Provide a separate, composite type floor plan which makes an accurate presentation of these various features and functions. As part of the submittal, provide a set of plans that shows emergency egress for the facility.

1.11.2 DESIGN ANALYSIS

The design analysis shall include a separate fire protection report containing, but not limited to, review statements and/or comments on the following items, where applicable.

- a. Location and rating of fire walls and fire partitions.
- b. Column, floor, and roof protection.
- c. Path of travel for emergency egress and operation of panic exits.

- d. Access to building for fire fighting.
- e. Design and placement of fire and smoke stop doors.
- f. Labeled windows, where required.
- g. Venting of smoke.
- h. Placement of hand fire extinguisher cabinets.
- i. Type and adequacy of sprinkler system.
- j. Building exterior fire protection facilities and building clearances.
- k. Type of occupancy.
- 1. Zoning of fixed fire protection systems.
- m. Type and adequacy of fire alarm and detection systems.
- n. Zoning of fire alarm and detection systems.
- **o.** Number of zones of alarm and detection systems that are separately transmitted to the base or installation fire department.
- p. Type of Construction.
- q. Height and area limitation.
- r. Flame-spread and smoke-developed ratings.
- s. Water supplies for fire protection.

1.11.3 TECHNICAL GUIDE SPECIFICATIONS

None of the CEGS guide specifications are required to be submitted at this design stage. However; any Contractor generated specifications required to meet the project specifics, or individual specification items added to the provided guide specifications shall be submitted for review. Note that guide specifications 13930, WET PIPE SPRINKLER SYSTEMS, FIRE PROTECTION and 13851, FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE are required for this contract. As such they may be edited only for those portions that do not apply to this project. Note that this applies only to equipment items. Testing, qualifications, submittal requirements, etc., may not be modified or deleted. For the equipment items that do apply, no changes may be made.

1.12 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS

Specification Section 01410, ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS furnished with Division 1 of this RFP, contains requirements presently known to be required for environmental protection, compliance, and permits. It is the Contractor's responsibility to provide any additional requirements to ensure that the project is in full environmental compliance with Federal, State, Regional and local laws and regulations. All new environmental requirements shall be submitted with the 60% Design Review Submittal.

1.12.1 Design Analysis Chapter

The Contractor shall prepare a chapter in the Design Analysis entitled: "ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS". This chapter shall include a summary of environmental coordination, compliance, approvals, permits, and etc. required for the project. The Contractor shall include documentation of the coordinations, discussions, phone conversation records, and/or letters required to assure that the project is in full compliance with all Federal, State, Regional, and local environmental laws and regulations. A list of environmental permits, approvals, notifications, etc. that are required for the project shall be included.

1.12.2 Draft Environmental Protection Plan

The Contractor shall prepare and submit a Draft Environmental Protection Plan in accordance with the requirements of Section 01410 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS. If additional environmental compliance plans are identified, during the design, the Contractor shall submit the additional environmental plans and/or attachments.

1.12.3 Submittal of Environmental Permits, Notices, Reviews and/or Permit Applications and Associated Documents

As an Appendix to the Draft Environmental Protection Plan, the Contractor shall submit copies of all environmental permits, notices, reviews, and/or approvals that are required for the project. Copies of the applications and associated documents required by the the environmental permits, notices, reviews, and/or approvals shall be included in the Environmental Protection Plan Appendix.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION 01021

100 PERCENT DESIGN REQUIREMENTS

PART 1 100 PERCENT DESIGN SUBMITTALS

For general submittal requirements, see Section 01331 SUBMITTALS DURING DESIGN AFTER AWARD.

1.1 SITE PLANNING

In addition to the following requirements the 100% submittal shall include incorporation of all comments from the 60% design.

1.1.1 Drawings.

All drawings shall be completely dimensioned in HARD metric units, labeled, and noted. All approved comments from the 60 Percent Design Submittal shall have been incorporated. Cross-reference applicable sheets for items shown. Drawings required:

- 1.1.1.1 Location Plan and Vicinity Map
- 1.1.1.2 Construction Phasing Plans
- 1.1.1.3 Removal Plan
- 1.1.1.4 Site Plans
- 1.1.1.5 Site Details
- 1.1.1.6 Landscape Plans
- 1.1.1.7 Landscape Details

1.1.2 Specifications

- a. Provide complete edited specifications for all items. Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.
- b. Specifications shall be coordinated with the plans and include all items including seeding, sodding, trees and shrubs, and exterior furnishings. Special sections shall be prepared to cover those subjects for which no pattern guide specifications are available. All UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added.

1.1.3 Design Analysis Narrative

Design analysis shall include the following:

1.1.3.1 References

Provide design references used in preparing the site design.

1.1.3.2 Basis For Design

The Design Analysis should give the basis, specific goals, objectives and priorities for site design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Document pollution prevention measures and other environmental considerations made during the design process.

1.2 CIVIL

1.2.1 Drawings

1.2.1.1 Grading and Drainage Plan

A final grading and drainage plan shall be provided at the same scale as the site plan. New and existing grading contours shall be indicated at 0.25 m contour intervals. Indicate the finished floor elevation of all new buildings. Plans shall show the layout of the new and existing storm drainage and roof drainage systems. Uniform grades shall be labeled using slope arrows. Provide spot elevations at building corners, parking area corners, changes in grade, etc. Storm drainage lines and structures shall be labeled. The rim elevation of all manholes, curb inlets, and area inlets shall be indicated.

1.2.1.2 Not Used

1.2.1.3 Grading Sections

Provide as a minimum two grading sections (one east-west and the other north-south through the area of new grading work. These grading sections shall show new vs. existing grades, slopes of finished grades, finish floor elevations in the new building, and identification of main features such as parking areas, building, and walks.

1.2.1.4 Roof Drain and Culvert Profiles

Provide profiles of all new culverts showing new and existing grades, new and existing utilities, pavement sections in detail, pipe diameters and lengths, pipe slopes, invert elevations, etc. Class and gauge of all culvert pipes shall be provided. This information may also be included in a Storm Drain Schedule drawing. Profiles of roof drain runout lines may or may not be provided, at the Contractor's discretion. However, invert elevations, lengths and pipe diameters of these roof drains shall be called out on the drawings.

1.2.1.5 Drainage Structure Details

Provide typical details of all storm drainage structures.

1.2.1.6 Pavement Details

Provide details of concrete curb and gutter, integral curb, typical pavement sections, typical sidewalk section, pavement utility cut details, and interface detail between new and existing pavement. Include pcc pavement, sidewalk, and curb and gutter joint plans and joint details.

1.2.1.7 Erosion Control Details

Provide details of best management practices used to control erosion.

1.2.2 Specifications

Provide complete edited specifications for all items. Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

1.2.3 Design Analysis Narrative

Design analysis shall include the following:

1.2.3.1 References

Provide design references used in preparing the civil design.

1.2.3.2 Grading

A narrative of the grading design and criteria used.

1.2.3.3 Drainage

A narrative of the drainage design and criteria used. Include information on the storm drain pipe materials selected and their ability to withstand earth dead loads and live loads that will be imposed.

1.2.3.4 Pavements

A narrative of the pavement design and criteria used.

1.2.4 Design Analysis Calculations

1.2.4.1 Storm Drainage System Calculations

Storm Drainage System Calculations shall include the following:

- a. Drainage area map showing boundaries of each drainage area and respective drain inlet or culvert.
 - b. Storm run-off calculations for each drainage area.
- c. Tabulation of capacities of new storm drains including: diameter and slope of storm drain pipes, design storm discharge and velocity for each storm drain pipe, maximum discharge capacity of each storm drain pipe, headwater depth of each culvert during design storm discharge.
- d. Hydraulic capacity calculations for each new curb and area inlet.

1.2.4.2 Pavement Design Calculations

Include all calculations, a complete copy of the software and manuals used in the design.

1.2.5 Storm Water Pollution Prevention Plan (SWPPP)

If construction activities results in disturbance of 5 acres of land or more, coverage under the *EPA Storm Water General Permit For Construction Activities* is required and the Contractor shall be responsible for complying with the requirements of Specification Section 01356 STORM WATER POLLUTION PREVENTION MEASURES and KDHE requirements. The Contractor and the Kansas City District Corps of Engineers shall be co-permittees. If coverage under the NPDES General permit is not required, Specification Section 01565 shall not be applicable.

1.3 GEOTECHNICAL

1.3.1 Drawings

1.3.1.1 Soil Boring Locations

Foundation and pavement design recommendations included in the Final Soils Analysis Report (Attachment A) are based on soil borings obtained for this project. Drilling, sampling, and testing of subsurface soils was performed by the Kansas City District Corps of Engineers. Soil boring locations are shown on the Soil Boring Location Plan included with this RFP package.

1.3.1.2 Soil Boring Log Sheet

Foundation and pav

ement design recommendations included in the Final Foundation Analysis Report (Attachment No. 2) are based on soil borings as discussed in paragraph 1.3.1.1. Soil boring logs are included with this RFP package.

1.3.2 Design Analysis

The de

sign and construction of building foundation, floor slab and pavement features for the CDC Project shall comply with all requirements in the Final Foundation Analysis Report (Attachment No. 2). As indicated in paragraphs 1.3.1.1 and 1.3.1.2 above, all recommendations are based on site specific soil borings obtained for the CDC Project. A copy of the Final Foundation Report shall be included as an appendix to the Design Analysis.

1.4 WATER SUPPLY AND WASTEWATER

1.4.1 Drawings

Generally, the corrected and approved 60 percent plans may be used as the basis for the final plans. However, all details necessary for complete construction must be included. The 100 percent final design submittal shall include all the information presented in the 60 percent submittal, updated to final design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any concerns in developing the final design documents shall be resolved prior to starting the final design stage.

1.4.1.1 Water Distribution and Sewage Collection Systems Plans (including building services)

Provide all existing utilities and above ground features, including sizes and material types, which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Indicate existing pipe

material and sizes where new lines connect along with the type of connection and elevations of connections. Provide all new water and sewer lines with sizes. This will include all new service lines, up to within the 1.5 meter building line. Locations of all new manholes, fire hydrants, valves (including PIV's), similar appurtenances, and connection points shall be provided. Show contours on plan view. Include stationing on both plan and profile sheets.

1.4.1.2 Water Distribution and Sewage Collection Systems Profiles

Profiles of all gravity sewers and waterlines shall be provided. Profiles may be omitted for short waterlines, unless necessary to assure adequate cover or avoid interference with other underground facilities. Indicate existing pipe material and sizes where new lines connect. Indicate type of connection and elevation. Include all interference elevations.

1.4.1.3 Water Distribution and Sewage Collection Systems Details

Appropriate water and sewer details shall be provided. The standard detail sheets will be furnished if required. For roadway pavement crossings, indicate installation method (open cut, boring, jacking, trenchless excavation, etc.). Include standard casing details.

1.4.2 Specifications

Specifications shall be coordinated with the plans and include all items. Provide special sections to cover those subjects for which no UFGS guide specifications are used or available. These special sections shall include all approved changes from the 60 percent review stage. All UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added.

1.4.3 Design Analysis Narrative

Design analysis shall include the following and all applicable data contained in the 60 percent design analysis narrative shall be repeated. References shall not be made to the previous design analysis. The final design analysis shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design.

1.4.3.1 References

Provide design references used in preparing the water and wastewater design.

1.4.3.2 Water Supply and Distribution Systems

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the interior and exterior fire flow requirements and the available flow and residual pressures. A description of the water distribution system, and complete calculations necessary to support equipment, piping sizes, interior and exterior fire demands, and domestic demands, etc. shall be provided.

1.4.3.3 Wastewater and Sewers

A narrative of the wastewater supply design and applicable criteria used

shall be provided. Include the average and peak contributing flows along with the available capacity and full flow capacity of the existing system. A listing of allowable piping materials, and complete calculations necessary to support equipment and piping sizes shall be provided.

1.5 ARCHITECTURAL

1.5.1 Drawings

The drawings shall be complete, include all necessary and required details, thoroughly checked, and fully coordinated with the technical Specifications and all other Construction Documents. Previous comments and applicable criteria changes shall have been incorporated into the design. The contract drawings shall fully describe the type and the scope of work required. The layout of individual sheets and the organization of the assembled set shall follow and communicate a logical sequence. General information shall be presented first, progressing to more detailed information. When assembling details, begin in the upper left-hand corner of the sheet with letters progressing to the right and down. When dimensioning, use arrowheads, not dots or slashes. Where major structural elements are included as parts of architectural detailing, do not indicate sizes. These elements must be fully defined in the structural design documents. See 60% Architectural drawing submittal requirements for drawing scales of remaining drawings to be submitted. Include all drawings from the 60% submittal plus all additional detail drawings required for complete 100% design. These shall include but not be limited to the following:

Door Details
Window Details
Louver Details
Roof Details
Stair Details
Wall Plan Details and Plan Details
Fire Wall Details and Penetration Conditions
Sealant Details
Ceiling Details
Control/Expansion Joint Details
All Miscellaneous Details

1.5.2 Technical Specifications

The technical specifications shall be complete and fully coordinated with the drawings. Special sections shall be prepared to cover those subjects for which no pattern guide specification is available. Notes to the Designer that accompany specifications shall be used in editing technical guide specifications. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All CEGS guide specifications shall be edited in accordance with Section 01331 SUBMITTALS DURING DESIGN.

1.5.3 Design Analysis Narrative

The Design Analysis shall include the basic information presented in the previous submittal, corrected to reflect changes in content made in response to review comments. Outline specifications shall be omitted from the Final Design Analysis as the information is included on the final drawings and project specifications. The design analysis shall be written in the present tense.

1.5.4 Design Analysis Calculations

The Design Analysis calculations shall include the basic information presented in the previous submittal, corrected to reflect changes in content made in response to review comments.

1.5.5 Common Deficiencies

Some repeated errors have occurred in the preparation of design documents in the past. Subsequently these errors have been identified and the Contractor directed to make corrections. The work involved in such corrections becomes lost effort and time for the designer. Some of these errors which are most often overlooked include:

- a. Not using correct abbreviations or terminology on the drawings. Abbreviations must match what is used on the standard abbreviation sheet and terminology must match what is used in the standard technical guide specifications.
- b. Not using the correct scales, north arrow designation, section cut system, or incomplete dimensioning on the drawings.
- c. Not providing sufficient space for door operation hardware at doors which swing into a wall running perpendicular to the opening. 100 mm minimum is required between edge of door frame and perpendicular walls.
- d. Not providing correct and complete Design Analysis information written in the present tense. The Design Analysis will be written following the format indicated herein. A separate Fire Protection section in the Design Analysis with input from all disciplines is one area which is often overlooked and shall be included.
- e. Not providing a structural stoop at exterior doors where the slab is at the same approximate elevation as the interior floor. The use of simple slabs on exterior grade leads to lifting of the slab in below-freezing temperatures which interferes with the safe operation of the door.
- f. Not correctly presenting or coordinating (to avoid interference) features of Fire Protection, Noise Control, and Physical Security.
- g. Not correctly referencing and cross referencing building sections, wall sections, details, etc.
- h. Failure to read/use technical notes in editing the Technical Guide Specifications.
- i. Failure to coordinate all disciplines prior to submittal of projects for review.
- j. Improper use of fire-retardant wood. Fire-retardant wood is combustible; its use in buildings that are of noncombustible construction is extremely limited (see UBC for the minor allowable uses). Because of the potential for severe degradation, fire retardant plywood shall not be used in a roof or roofing system, or in structural applications.

- k. Incorrectly listing trade names in door hardware specifications in lieu of ANSI numbers and failure to correctly specify hardware finishes.
- 1. Control joints in CMU walls and brick expansion joints in face brick are not shown on both architectural plans, elevations and structural plans, or are inconsistent. Note also control joint locating and coordination for floor tile per Tile Council of America recommendations.
- m. Failure to delete all publications which do not apply to the particular project.
- ${\tt n.}$ North is not oriented the same direction on all sheets (civil, site, arch).

1.6 INTERIORS

1.6.1 Design Analysis/Narrative

Provide a complete and fully edited design analysis section for Interior Design. Updates as a result of the 60% review shall be made to the design analysis.

1.6.2 Technical Specifications

All appropriate UFGS guide specifications shall be provided for all materials used and shall be coordinated with the drawings and design analysis. Specifications shall be fully edited to identify proposed product and installation requirements. Where materials or installation requirements are not covered in the provided specifications, information shall be prepared to cover these items. In addition to guidance provided in specification Section 01331, SUBMITTAL PROCEDURES FOR DESIGN AFTER AWARD on editing technical specifications, data and sample submittals for all interior and exterior finishes (including but not limited to interior design and architectural specifications) shall be "AE" submittals. Fully edited specification sections shall include, but are not limited to:

- A. All outline (performance) specification sections listed in government specification Section 01014, INTERIOR DESIGN.
- B. All government edited specification sections provided as part of ${\tt DIVISION}\ 1$ of this document.
- C. Newly contractor-created specification sections listed in government specification Section 01014, INTERIOR DESIGN.

1.6.3 Color Boards

Color boards shall be fully edited to include approved changes as a result of the 60 percent submittal. Architectural (AE) design color boards shall be supplied in the format described in government specification Section 09920, CONTRACTOR COLOR BOARDS, paragraphs 2.1 and 3.1. The color boards shall show actual color samples of all proposed exterior and interior finishes. Samples shall be identified by a universal symbol that is used to describe the material on the color boards and drawings for cross reference purposes. A copy of the Interior Finish Schedule and Interior Finish Materials Legend shall accompany the color boards to aid in clearly

identifying all finishes. Clarification of finish placement shall be required when more than one color of a single finish is proposed. A minimum of four complete sets shall be supplied to the government.

1.6.3.1 Government Approval

Contractor submitted colorboards shall be reviewed and **APPROVED** by the Government. Government approved AE design colorboards shall become a part of the Contract.

1.6.4 Drawings

Drawings shall be a complete set of architectural drawings as noted in paragraph 1.5.1 of this specification. incorporating all approved comments from the 60 percent submittal. In addition to the drawings and their requirements listed in specification Section 01020, DESIGN AFTER AWARD - 65 PERCENT, the following drawings shall be provided:

1.6.4.1 Enlarged Plans

Enlarged, scaled, expanded floor plans shall be provided for the following rooms or areas:

- A. Toilets. Provide expanded plans for all toilet rooms. Minimum scale: 1:20. Plan shall locate and dimension all toilet partition components including partition dividers, doors, and stiles. Plan shall dimensionally locate all wall-mounted accessories to include a symbol/key legend for all accessories.
- B. Kitchen and Scullery. Provide an expanded plan for the kitchen and scullery. Minimum scale: 1:20. Plan shall locate and dimension all kitchen equipment, countertops, and shelving. Provide an equipment legend with basic utility requirements.

1.6.4.2 Interior Elevations

Fully dimensioned interior elevations shall be provided of all walls or partial wall areas required to visually and dimensionally locate interior architectural materials, finishes, cabinetry, or equipment incorporating all approved comments from the 60 percent submittal. Interior elevations shall include symbology for required detail cross sections.

1.6.4.3 Schedules and Legends

Provide a fully edited finish schedule in the COE format provided. Provide a fully edited and complete Interior Finish Materials Legend in the COE format provided.

1.6.4.4 Large Scale Details

Large scale details including elevations, cross-sections, and other detail drawings shall be provided as necessary to completely and clearly indicate the design intent and construction materials and installation methods intended. Scales shall be sufficient to allow for full dimensioning, identification of construction materials, and legibility at half-scale drawing size. As a minimum, the following items shall be fully detailed:

A. Fabricated Kitchen Equipment. Includes countertops, shelving, and other items custom fabricated to required dimensions. Drawings shall

include plan views, elevations, typical cross-sections, and installation details.

- B. Cabinets and Casework. Includes countertops, base cabinets, wall cabinets, and reception desk. Drawings shall include plan views, elevations, typical cross-sections, and installation details.
- C. Interior Signage. Provide scaled elevations of all signage types and sizes to include typical lettering size and location. Provide details regarding installation methods and typical mounting locations.

1.6.4.5 Floor Patterns

Where floor patterns are required or indicated, scaled floor plans of all patterned areas showing the floor patterns shall be provided utilizing a legend and symbols which clearly differentiate colors and provides a graphic representation of the intended pattern.

1.6.4.6 Interior Signage Plans

All interior signage shall be located on enlarged, scaled floor plans utilizing a system of symbols or legend which cross-references to signage details and the interior signage specification.

1.6.4.7 Furniture/Equipment Plan

Provide a scaled furniture and equipment floor plan which includes, and clearly differentiates between, both contractor and government supplied equipment and furnishings. Government supplied furnishings and equipment shall be shown in typical (estimated) sizes and configurations to illustrate adequate space and circulation space has been provided.

1.7 STRUCTURAL

The 100 percent final design submittal shall include all the information presented in the 60 percent submittal, updated to final design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any concerns in developing the final design documents shall be resolved prior to starting the final design stage.

1.7.1 DRAWINGS

Final drawings shall be complete, thoroughly checked, and fully coordinated with the other disciplines, specifications and all other construction documents. Previous comments and applicable criteria changes shall have been incorporated into the design. The drawings shall be complete with all plan views, elevations, sections, details, schedules, diagrams, and notes necessary for the construction of the project. For structural steel framing, the drawings shall meet the requirements for design drawings set forth in the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. All structural steel members and connections shall be fully detailed. Design of structural steel connections shall be the responsibility of the structural design engineer and shall not be delegated to the steel fabricator. For structural concrete, the drawings shall conform to the standards for engineering (design) drawings set forth in the ACI Detailing Manual-1988 (SP-66). Additionally, those items described below which are applicable to the design shall be incorporated into the drawings. Drawings shall be at a

scale appropriate for the design, in no case however, shall plan type drawings be done at a scale smaller than 1:100 or detail type drawings at scale smaller than 1:20.

1.7.1.1 Grid Systems, Dimensions, and Floor Elevations

Each foundation and slab plan, floor framing plan and roof framing plan shall have an alpha-numeric grid system aligned with any columns or pilasters, or with load bearing and non-load bearing walls, as applicable. The same grid system shall be used for all plan views. Each plan view shown shall have all necessary dimensions. On plan views, the dimensions shall define the location of grid lines, offsets, and all structural elements, as well as the overall sizes of the structure. The finish elevation of the ground floor slab shall be indicated as 100000mm, and elevations for all other structural elements shall be numerically referenced to this basic elevation.

1.7.1.2 Plan Sheets

a. Foundation and Slab Plans

Foundation and slab plans shall show the size and location of all foundation elements, such as foundation walls and footings. Elevations for footings shall be indicated on the plan. Plans for slabs-on-grade and exterior stoop slabs at building entrances shall show location and type of joints, slab thicknesses and reinforcing, elevation of slab surfaces, and any other design features, such as equipment bases and areas of depressed slab surface, which affect the slab design. Also, indicate that slabs are placed over vapor barrier and capillary water barrier.

b. Roof Framing Plans

Roof framing plans shall be provided for all parts of the structure. Plans shall show the size, spacing, and location of all roof framing members, their supporting columns, pilasters or walls, all auxiliary members such as bracing and bridging, orientation and extent of coverage of structural roof deck materials, and the size, location, and framing of all major openings through the roof.

1.7.1.3 Elevation Views, Sections and Details Sheets

Elevation views, sections and details necessary to illustrate fully the design shall be provided. Some requirements peculiar to the various structural materials are described below.

a. Concrete

Include elevation views as necessary, plus sections and details to show the outlines of concrete cross-sections, reinforcing bar arrangements, concrete cover for rebar, installation of embedded items, and joint construction. All lap splice and embedment lengths for reinforcing bars shall be clearly indicated on the drawings. A sill detail for each foundation condition at exterior and interior doors shall be provided.

b. Masonry

Wall reinforcing shall be located and identified on plans, in section cuts and elevation views. Structural wall elevations shall be included to clarify the construction requirements for masonry reinforcement, especially

the reinforcement around wall openings, piers, bond beams, masonry lintels and at control joints. Details applicable to the project shall be shown on the structural drawings. Listed below are some frequently required masonry details, most of which are shown in Army Corps of Engineers TI 809-04. Additional details as required shall be extracted from other sources and incorporated into the final drawings. All details shall be fully edited to reflect the specific requirements of this project. Supplemental details shall be added as necessary to complete the design.

Masonry Details Frequently Used

- Masonry Control Joint (MCJ).
- Control Joint at Bond Beam.
- Bond Beam Corner Reinforcement.
- Seismic Reinforcement Around Wall Openings.
- Wall Reinforcement Details for 1 and/or 2 bar-per-cell stiffeners.
- Doweled or Other Connection of Masonry to Foundation, Floor, Roof or Bond Beam.
- Bond Beam (or Steel) Lintels and Bearing Details
- Lateral Support Detail for Top of Masonry Partition Walls. (lateral support locations must be shown on framing plan sheets.)
- c. Structural Steel, Steel Joists, and Steel Decking

Structural steel connections shall be fully detailed and shown on the drawings. The anchorage of beams, trusses, joists, and steel deck to walls or other bearings, and the extra framing or reinforcement required at deck openings shall also be detailed. Notes, details, or schedules on the drawings shall indicate the steel deck attachment method to be used, and shall give the size and spacing for perimeter, side lap, intermediate supports and end lap attachments. Welded connections shall be detailed using standard weld symbols illustrated in AWS D1.1. All applicable weld sizes, spacing, types, contours and finishes shall be shown.

1.7.1.4 Schedules

a. Foundation Schedules

Foundation schedules for footings shall be included, as applicable. The schedule shall include all pertinent information required for the foundation system being used.

b. Framing Schedules

For concrete framing, beam and column schedules shall conform to the requirements of the ACI Detailing Manual. For structural steel framing, provide a column schedule complete with column base plates and design loads at splices, if any, and at column bases.

1.7.1.5 Equipment Loads

All equipment loads which exceed 44N and are not supported by concrete slab-on-grade shall be identified on the drawings by showing equipment locations, total weights, and reaction loads at support points.

1.7.1.6 Notes

a. Design Notes

Under the heading "Designer's Notes," the structural drawings shall contain notes which begin: "The structural design was prepared using the following data:". The data then listed shall include the structural loading criteria used for design, such as roof and floor live loads, snow load design parameters, wind speed and wind load design parameters, seismic design parameters, allowable soil bearing pressures (as recommended by the Final Foundation Analysis report), foundation design depth, design wind uplift pressures for steel joists and other data pertinent to future alterations. Also, to be listed are the ASTM designations and stress grades of the applicable structural materials: steel, masonry, concrete for each usage, reinforcing bars, welds, and bolts.

b. General Notes

Other notes, which direct the work to be performed, the materials to be used, etc., shall be grouped under the heading of "General Notes." Included in these notes should be a description of the building's structural system, if necessary.

1.7.2 SPECIFICATIONS

Technical specifications for final design shall be prepared in accordance with the instructions provided in Section 01331. The technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

1.7.3 DESIGN ANALYSIS NARRATIVE

The final design analysis narrative shall repeat and expand upon the basic information presented in the 60% design analysis narrative, and shall be corrected to reflect revisions made for the final design.

1.7.4 DESIGN ANALYSIS CALCULATIONS

Calculations shall be prepared by an experienced structural engineer and shall include an investigation of loading, (gravity, wind, seismic, etc.) shear, moment, wind uplift, stability and deflection calculations. The computations are to be systematic and accurate. Similar beams, columns, panels, or connections may be grouped by designing the largest member or connection in the group, but every individual slab, beam, column, footing, connection or other structural member or structural consideration indicated by the plans shall be accounted for by pertinent calculations, statement or reasoning, or reference to source. Design formulas shall be written out in symbols the first time each is used, before the numerical values are supplied. All answers shall be identified by dimensional units. Basic assumptions of loads, working stresses, and methods of analysis must appear in the calculations; these assumptions must be applied consistently to a given problem. The calculations shall be presented in a clear and legible form, incorporating a title page, table of contents, and a tabulation showing all design loads and conditions. Pages shall be numbered consecutively and identified in the table of contents. Cross referencing shall be clear. The source of loading conditions, formulas, and references will be identified. Assumptions and conclusions will be explained. Superseded areas of computations must be ruled out. All computations shall be given a complete numerical and theoretical check within the Contractor's office. Calculation sheets shall carry the names

or initials of the developer and the checker, and the dates of calculations and checking. No portion of the design calculations shall be developed and checked by the same individual.

1.7.4.1 Computer Calculation Submittals

All applicable input and output data shall be included in readable printed form as part of the design calculations. Continuous paper such as that used in computer terminals or printers shall be cut into individual pages and shall not be submitted in a continuous roll form. All input and output data shall include a brief synopsis of the computer program(s) stating required input, method of solution, approximations used, codes and specifications used, output generated, extent of previous usage or certification of the program(s), and program author(s). Generalized flow chart(s) may be used to supplement description of solution process, if desired. All computer generated and long-hand calculation sheets shall be identified by sheet number, indexing and cross-referencing. Each member or structure being analyzed shall be identified, dimensioned and shown in a loading diagram. A separate diagram shall be provided for each load case, such as dead plus live, dead plus wind, etc. Input and output values including intermediate values shall clearly be identified if such values are necessary for evaluation of the submittal.

1.8 MECHANICAL

The 100 percent final design submittal shall include all the information presented in the 60 percent submittal, updated to final design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any concerns in developing the final design documents shall be resolved prior to starting the final design stage.

1.8.1 DESIGN ANALYSIS NARRATIVE

The Final Design Analysis Narrative shall include the information presented in the 60 percent submittal. The information shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design.

1.8.2 CALCULATIONS

The Final Design Analysis calculations shall include all the information presented in the 60 percent submittal, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design. In addition, the following new calculations shall be provided:

1.8.2.1 Pump Selections

Include pump flow calculations as specified in Section 01016, MECHANICAL REQUIREMENTS and catalog selection data indicating dimensions, connection sizes, rpm, horsepower, and efficiency.

1.8.2.2 Domestic Hot Water Recirculation Pump Selection

Include pump flow calculations as specified in Section 01016, MECHANICAL REQUIREMENTS and catalog selection data indicating dimensions, connection sizes, rpm, horsepower, and efficiency.

1.8.2.3 External Pressure Drop Calculations

External pressure drop calculations for all fans as specified in Section 01016, MECHANICAL REQUIREMENTS shall be provided.

1.8.2.4 Hydronic Calculations

Pipe sizing and pump head calculations for the chilled & heating hot water, plumbing, gas piping systems as specified in Section 01016, MECHANICAL REQUIREMENTS shall be provided.

1.8.2.5 Expansion Tank Sizing

Chilled & heating hot water expansion tank sizing shall be provided.

1.8.2.6 Electrical Load Summary

A summary of all mechanical equipment and the associated electrical load requirements shall be provided.

1.8.2.7 Control Valve CV

Provide Control Valve CV calculations.

1.8.3 CONSTRUCTION DRAWINGS

The drawings shall be fully coordinated with the design analysis and specifications. Provide sufficient plans, piping diagrams and isometrics, sections, air and water flow diagrams, details, schedules, and control diagrams/sequences of operation etc. shall be provided as necessary to define the required design intent and requirements. The designer shall show on the construction drawings all items which are referred to with phrases such as "as shown", "as indicated", "as detailed", etc within the UFGS Specifications. The construction drawings shall show, to scale, the actual equipment to be installed and all required clearances required for operation, routine maintenance, and replacement of minor and major components. The drawings shall not show any piping, ductwork or other mechanical equipment to be exposed in finished spaces except where approved by the government. All exposed items shall be called out to the government for approval before proceeding. Access panels required for concealed items shall be shown on the construction drawings. The design and installation shall be fully coordinated with all other trades involved in the design and construction of the facility. Special care shall be given to National Electric Code requirements for clearance in front of and above electrical equipment. The construction drawing shall be produced to incorporate the requirements below into all drawings. Furthermore, the requirements below shall be repeated in the form of general notes on every mechanical (both HVAC and plumbing) construction drawing that shows a plan view. General notes shall include any mechanical general installation notes that may be required to clarify the construction intent that may not be readily apparent in the specifications or on the drawings. General notes may be provided on a separate sheet if space does not exist on the plan sheets. Sheet reference number sequencing shall be in accordance with the A/E/CCADD Standards Manual, ERDC/ITL TR-01-6. Submittal drawings shall include, but not limited to, the following:

1.8.3.1 Drawing Clarity

All drawings specified below, when reproduced at half scale, shall be clear

and easily readable as determined by the Contracting Officer's Representative (COR).

1.8.3.2 Drawing Coordination

Show on all mechanical drawings specified below, all items of mechanical equipment and systems, to determine proper space allocation within the limits of the architectural, structural and electrical layout requirements. Plans, elevations, and sections shall be developed sufficiently to insure that major equipment items, piping, and ductwork cause no interference with architectural members, structural members, electrical equipment, etc.

1.8.3.3 HVAC Controls Legend

This sheet shall include all control abbreviations and symbols that will be used on the drawings and on the Final Control Drawings. Control abbreviations and symbols shall be as specified in Army Technical Instructions, TI 810-11, Heating, Ventilating and Air Conditioning Control Systems for all abbreviations and symbols used.

1.8.3.4 General HVAC Control Drawing Requirements

Control schematics showing all control system interface points and detailed sequence of operation shall be provided for all mechanical equipment and systems. Control drawings shall be as specified in Army Technical Instructions, TI 810-11, Heating, Ventilating and Air Conditioning Control Systems and as specified in section 01016, MECHANICAL REQUIREMENTS. The drawings shall include at a minimum each of the componets specified below for each of the systems specified below. In addition to the componets specified below , damper and control valve schedules shall also be provided. Standard Control Drawings based on the requirements of TI 810-11 are available for each system type.

1.8.3.5 Control Diagrams

Control Diagrams shall be provided for each system or item of equipment. Systems diagrams shall include every major component installed in or connected to the system, and only one system shall be shown on each diagram. Control Diagrams shall schematically show all sensors, controllers, actuators, indicators, and operator interface devices that are required for the complete automatic control and monitoring of the system. All sensing devices utilized in the control or instrumentation of the system, and all actuating devices shall be shown in their correct mechanical location and functionally interconnected to the other control devices which comprise the control loop. All controlling devices shall be shown with all functional interconnections to inputs and outputs. Each sensing, controlling, actuating, and indicating device shall have its own unique control loop tag identifier. Communication linkages required to complete the entire intended interface between operators and the control system shall be shown schematically. This includes interconnections between local temperature control panels and the base EMCS. All associated thermometers and pressure gauges, located in their correct mechanical locations, shall also be shown on the diagrams. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

1.8.3.6 Sequence of Operations

Sequence of Operations shall be provided for each item of equipment or system and shall fully describe the intended operation of the equipment or

system in all different operating modes. As identified on the furnished Example Control Drawings, each Sequence shall be broken down by individual control loops and shall include descriptions of both normal operating modes (running, shutdown, standby, etc.) and abnormal, emergency or safety related modes. Sequences shall include a description of all indication instrumentation, alarm conditions, and automatic actions to be taken upon occurrence of alarm conditions. Each device referenced in the sequence shall be referred to by its unique tag identifier, with each component designator shown in parenthesis. Design setpoints shall be specified for each control loop and indicated as being adjustable. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

1.8.3.7 Control Points Lists

Control points lists, identifying each temperature control system input and output, shall be developed for each temperature control panel.

1.8.3.8 Functional Performance Checklists

The designer shall analyze every component of each system and write Functional Performance Checklists to compliment each Sequence of Operation. The Functional Performance Test Checklists shall be explicit and written to ensure that all the requirements of the Sequence of Control on the project drawings can be accomplished.

1.8.3.9 Hot Water System

Provide a hot water flow diagrams showing the boiler modules, pumps, and all connected heating equipment as the system control schematic. All thermometers, pressure gauges, isolation and control valves, bypass piping, etc. shall be shown on the flow diagram. In addition, provide a sequence of operation.

1.8.3.10 Chilled Water System

Provide a chilled water flow diagrams showing the chiller, fluid coolers, pumps, and all connected cooling equipment as the system control schematic. All thermometers, pressure gauges, isolation and control valves, bypass piping, etc. shall be shown on the flow diagrams. In addition to the chilled water pumping system control schematic, provide a sequence of operation. Include all items of equipment that are interlocked to each system.

1.8.3.11 Air Handling Systems

For each air handling system, including outside air makeup system, provide a control schematic and a sequence of operation. Include all items of equipment that are interlocked to each system.

1.8.3.12 Misc Systems

These sheets shall include all miscellaneous equipment items such as supply/exhaust fans, unit heaters, radiant floor heating, infra-red heaters, controls, air compressors, etc. that are not interlocked to the main HW, CW or air handling unit systems. Provide control schematic and sequence of control for each item of equipment on the same sheet.

1.8.4 SPECIFICATIONS

The submitted 60 percent technical guide specifications shall be updated, completely edited, and fully coordinated with the drawings to accurately and clearly identify the final product and installation requirements for the facility. Technical specifications shall be Unified Facilities Guide Specifications (UFGS), which shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility as specified in Section 15000, DIVISION 15: MECHANICAL - OUTLINE SPECIFICATIONS. The UFGS specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. All UFGS specification indexes shall be completely edited to reflect the paragraphs retained in the body of the technical specification. All references that have not been used in the body of the technical specification shall be edited from the UFGS specification. Technical specifications shall be coordinated with the plans and include all items contained within the project. Provide special sections to cover those subjects for which no UFGS guide specification is available. Specific items of equipment identified in the UFGS specifications but not required for the facility shall be edited out. All edited UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added. Government conformance review is required for any specification addition or deletion.

1.9 ELECTRICAL

1.9.1 Drawings

Drawing scale shall match architectural drawing requirements.

1.9.1.1 Interior Drawings

Drawings shall be complete and accurate in every detail and shall include arrangements and types of light fixtures, receptacles, switching, location of special features, necessary details, including legends, fixture schedule, panel schedules, one-line diagrams, layout or functional diagrams for each of the various systems, riser diagrams if applicable, estimated maximum demand for each panel and for entire building and any other relative information which will help clear up any and all questionable items on the plans or in the specifications toward the development of a set of plans which will be clear, concise and correct. Additional drawing requirements for specific equipment or systems have been included in subsequent paragraphs pertaining to the equipment or systems.

1.9.1.2 Floor Plans

All rooms must be identified by name and number. Plans must be legible. Plans shall be developed using the same scale and areas as the architectural floor plans. Separate floor plans must be provided for lighting, power, communications, and fire detection.

1.9.1.3 Diagrams

The power one-line diagram shall be on a dedicated sheet. The diagram should show ratings of major equipment including short circuit ratings. Power, communications diagrams, fire detection and telephone diagrams should be on separate sheets also.

1.9.1.4 Schedules

Provide panelboard and lighting fixture schedules. Panelboard schedules shall include the designation, location, mounting (flush or surface), number of phases and wires, voltage, ampacity and total connected and demand load. Indicate the trip rating, frame size, interrupting rating and number of poles for each circuit breaker in the panelboards. List the circuit number, circuit description and load for each branch circuit.

1.9.1.5 Exterior Drawings

Drawings shall be complete and accurate in all details and shall include the routing of all feeder and branch circuits.

1.9.2 Specifications

All specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product, installation requirements, and testing methods for this facility.

1.9.3 Design Analysis Narrative

The text of the preliminary design analysis should be expanded to reflect the completed design. Calculations used to develop the design should be included. The document in its final form should conform in all applicable respects to the requirements of Section 01007 ELECTRICAL DESIGN REQUIREMENTS.

1.9.4 Design Analysis Calculations

Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials, selection of economic alternatives, performance of specific systems or equipment. Calculations may be performed by manual or computerized procedures. Use of standardized charts, curves, tables, graphs will generally be acceptable for portions of required calculations or in lieu of specific calculation procedures. Such data must be from a recognized source which is identified in the design analysis. If possible, a copy of applicable sheets or pages should be included with the calculations. For given equipment, the calculations must conform to requirements identified under subsequent paragraphs herein pertaining to the equipment.

1.9.4.1 Service

Sizing of building service.

1.9.4.2 Transformers

Sizing of all transformers. (Generally for dry type transformers, 1 or 2 samples of detailed calculations to identify the method are sufficient, if input data for remaining units can be derived from panel or feeder sizing data.)

1.9.4.3 Feeders

Sizing of feeders (One detailed sample calculation is sufficient to establish the procedure, remaining data can be in schedules, tables, etc.).

1.9.4.4 Panelboards

Sizing and loading of panelboards and distribution equipment.

1.9.4.5 Voltage drop determination

Provide voltage drop calculations in accordance with IEEE 241 to demonstrate that the voltage drop requirements of NFPA 70 are satisfied.

1.9.4.6 Illumination calculations

Data should identify target and calculated illumination levels for all rooms and areas. Calculations should be adjusted to compensate for special applications -- irregularly shaped rooms, open sides, ceiling obstructions (beams, ductwork), corridors, etc. If the lumen method is used for corridor calculations, the calculations should be performed using a module in which the length doesn't exceed 3 times the width (2:1 ratio preferred).

1.9.4.7 Short Circuit Evaluation

Calculate the fault current in accordance with IEEE 242 for each node in the electrical distribution system.

1.9.4.8 Protective Coordination Analysis

A protective coordination study (if required) shall be performed to show that the power system is selectively coordinated and is fully coordinated with the upstream overcurrent devices. The study shall include the interior electrical distribution system and primary distribution system back to the existing primary line. The protective coordination / short circuit study shall be complete and approved by the government before any changes are make to the existing equipment.

1.9.4.9 Specialized Applications

Additional engineering backup should be included to address special requirements such as accommodation of nonlinear loads, harmonics analysis, energy studies, etc.

1.10 FIRE PROTECTION

1.10.1 DRAWINGS

Design will be an extension of the 60% submittal, incorporating all comments thereto and any revised criteria, all as specifically directed by the District Office. All conflicts, lack of specific criteria, and/or direction, inconsistencies, ambiguities, and lack of thorough understanding of the nature and scope of work shall be resolved prior to starting final design work. The fire protection plans shall show the following: entire sprinkler system; fire detection system, to include control panels, remote annunciators, alarm notification devices, and each initiating device; fire walls; fire partitions; building separations; other fire protection features.

1.10.2 DESIGN ANALYSIS

The final design analysis will be an extension of the 60% design analysis and shall be complete for every item covered in the design and will include, but not be limited to, the following:

a. List of design criteria.

- b. Design conditions.
- c. Design calculations.
- d. Complete description of system alarm zones.
- e. Complete description of system sprinkler system.
- f. Complete description of the building fire protection features.
- g. Other pertinent information of value for future use in construction contract administration, substantiation of design methods, or permanent record shall be included.

1.10.3 TECHNICAL GUIDE SPECIFICATIONS

The following CEGS guide specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility:

13930 Wet-Pipe Sprinkler System, Fire Protection

13851 Fire Detection System and Alarm System, Addressable

All items identified in the specifications not required shall be marked for deletion in accordance with the requirements of Section 01332 SUBMITTALS DURING DESIGN. Those items of equipment, materials, or installation requirements that are required are not permitted to be modified or changed from that presently shown. Government approval is required for the final submittal of these guide specs.

1.11 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS

All environmental requirements that have been identified during the design process shall be include in the 100% Environmental Protection, Compliance, and Permits Design Analysis Chapter, the 100% Environmental Protection Plan, and/or Appendix to the Environmental Protection Plan.

1.11.1 Design Analysis Chapter

The Contractor shall update the chapter in the Design Analysis entitled: "ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS". The updated chapter shall include additional summaries of environmental coordination, compliance, approvals, permits, and etc. required for the project. The Contractor shall include additional documentations of the coordination, discussions, phone conversation records, and/or letters required to assure that the project is in full compliance with all Federal, State, Regional, and local environmental laws and regulations. The Contractor shall included an updated list of environmental permits, approvals, notifications, etc. that are required for the project.

1.11.2 Environmental Protection Plan

The Contractor shall update the 60% Draft Environmental Protection Plan to include all additional environmental requirements identified. The updated plan shall be submit for final review and acceptance.

1.11.3 Appendix to the Environmental Protection Plan

As an Appendix to the Final Environmental Protection Plan, the Contractor shall submit copies of the completed permit applications and associated documents, notices, reviews, and/or approvals that are required for the project. Copies of all permits and/or approvals required for the project shall be included along with any additional requirements and/or conditions of the permits which are required during and/or at completion of construction.

1.11.4 NPDES Storm Water Permit

If the project requires coverage under the General NPDES Permit for Storm Water Discharges from a Construction Site, the Contractor shall submit the following.

1.11.4.1 Notice of Intent (NOI)

Parts I and II of the Contractor's NOI shall be completed.

1.11.4.2 Notice of Termination (NOT)

Parts II and III of the NOT shall be completed.

1.11.4.3 Storm Water Pollution Prevention Plan (SWPPP)

Complete the Storm Water Pollution Prevention Plan. A SWPPP outline is available at ftp:\\ftp.nwo.usace.arm.mil/pub/ED/SWPPP/ file name: SWPPP.DOC or SWPPP.PDF.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION 01100

GENERAL

PART 1 GENERAL

1.1 INQUIRIES

Pursuant to SECTION 00100 paragraph titled "Instructions to Offerors--Competitive Acquisition", any inquiries regarding this Invitation, before bids are opened, should be addressed to the District Engineer, Kansas City District, Corps of Engineers, 700 Federal Building, Kansas City, Missouri 64106, ATTN:/Mr. Clif Rope. Inquiries for which oral explanation or advice on the plans and specifications will suffice may be referred to Mr. Rope by calling Area Code 816-983-3476. Telephone calls concerning the mailing of plans and specifications should be made to Contracting Division at Area Code 816-983-3975. Collect telephone calls will not be accepted. (KCDO APR 84)

1.2 SUPERINTENDENCE OF SUBCONTRACTORS

- (a) The Contractor shall be required to furnish the following:
- (1) If more than 50% and less than 70% of the value of the contract work is subcontracted, one superintendent shall be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.
- (2) If 70% or more of the value of the work is subcontracted, the Contractor shall be required to furnish two such superintendents to be responsible for coordinating, directing, inspecting and expediting the subcontract work.
- (b) If the Contracting Officer, at any time after 50% of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirement for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made.

1.3 IDENTIFICATION OF EMPLOYEES

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display identification as may be approved and directed by the Contracting Office. All prescribed identification shall immediately be delivered to the Contracting Officer, for cancellation upon the release of any employee.

1.4 APPLICATION OF WAGE RATES

The inclusion of the Davis-Bacon Act General Wage Decision or the Service Contract Act Wage Determination in the solicitation is a statutory requirement. It is not a representation by the U.S. Army Corps of Engineers that any specific work task can be performed by any specific trade. Which work tasks can be performed by what trades depends on and is determined by the prevailing area practice for the local area where the contract is being performed. It is the sole responsibility of the bidder to determine and comply with the prevailing area practice. Inquiries

regarding a prevailing area practice should be directed to the Corps of Engineers, Contractor Industrial Relations Specialist (telephone number 816-983-3723) or to the Department of Labor Regional Wage and Hour Division.

Application of wage rates and fringe benefits: For the application of the wage rates and fringe benefits contained in the Decisions of the Secretary of Labor, attached to and a part of this contract, all work required within 5 feet outside building lines shall be considered Building (or Residential) Construction. All other construction not defined herein as Building (or Residential) Construction shall be considered Heavy Construction.

1.5 PAYMENTS TO SUBCONTRACTORS

The Contractor's attention is directed to CONTRACT CLAUSE titled "Payment Under Fixed-Price Construction Contracts." In addition to the requirements set forth in the referenced paragraph, the Government will reimburse the Contractor, upon request, for amount of premiums paid by the subcontractors for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor furnishes evidence of full payment to the surety.

1.6 PAYMENTS TO CONTRACTOR (KCD MAY 90 - FORMERLY FAR 52.2/9101(a))

The following is an example of a Contractor's release of claims clauses required to comply with the provisions of paragraph (h) of the CONTRACT CLAUSE titled "Payments Under Fixed-Price Construction Contracts":

RELEASE OF CLAIMS

The undersigned Contractor under contract dated,	2000,
between the United States of America and said Contractor for the	
, in accordance with p	aragraph
(h) of the CONTRACT CLAUSE titled "Payments Under Fixed-Price Cons	struction
Contracts" of said contract, hereby releases the United States, it	s
officers, agents, and employees from any and all claims arising un	der or by
virtue of said contract or any modification or change thereof exce	pt with
respect to those claims, if any, listed below:	

(Here itemize claims and amounts due.)

1.7 PARTNERING

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractor. This partnership will be structured to draw on the strengths of each organization to identify and achieve mutual goals with the intent to complete the Contract within budget, on schedule and in accordance with plans and specifications. This partnership will be bilateral in makeup, and participation will be totally voluntary. Any cost associated with implementing this partnership will be agreed to by the Contractor and the Government, and will be shared equally with no change in Contract price. To implement this partnership initiative, it is anticipated that thirty (30) days after Notice to Proceed, a team building workshop will be conducted. Follow-up workshops will be held periodically throughout the duration of the Contract as agreed to by the Contractor and the Government.

1.8 PROSPECTIVE CONTRACTOR RESPONSIBILITY

Each bidder shall furnish, within 3 calendar days after receipt of request

therefor, data which will show the bidder's ability to perform the work or services required by this Invitation for Bids. Such data shall include as a minimum: Bank certification of financial capability, or a financial statement not over 60 days old, which will be treated as confidential (if over 60 days old, a certificate shall be attached thereto stating that the financial condition is substantially the same or, if not the same, the changes that have taken place); names of commercial and financial reporting agencies from whom credit reports may be obtained; trade creditors; name and address of bonding company; business and construction experience; past record of performance of Government contracts; and construction plant and equipment available for this job, with resume of work in progress or other data that will assure that the bidder is in a position to perform the work within the time specified.

In addition, if the bid exceeds \$1,000,000, the bidder shall furnish upon request, a certified statement listing:

- (a) Each contract awarded to him within the preceding three-month period exceeding \$1,000,000 in value with brief description of the contract.
- (b) Each contract awarded to him within the preceding three-year period not already physically completed and exceeding \$5,000,000 in value with brief description of the contract.
- (c) If the prospective Contractor is a joint venture, each joint venture member will be required to submit the above defined certification. There shall also be furnished any other available information which will serve to substantiate the bidder's qualifications as a responsible prospective Contractor. (KCD APR 84)

1.9 LABORATORY AND TESTING FACILITIES

The Contractor shall provide and maintain all measuring and testing devices, laboratory equipment, instruments, transportation, and supplies necessary to accomplish the required testing. All measuring and testing devices shall be calibrated at established intervals against certified standards. The Contractor's measuring and testing equipment shall be made available for use by the Government for verification of their accuracy and condition as well as for any inspection or test desired pursuant to the CONTRACT CLAUSE titled "Inspection of Construction." The location of the laboratory shall be convenient to the site such that test results are available prior to proceeding with the next sequential phase of the work. (KCD)

1.10 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

- (a) This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE titled "Default: (Fixed Price Construction)." In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:
- (1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.
- (2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

(b) The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY

WORK DAYS BASED ON (5) DAY WORK WEEK

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(9)	(5)	(3)	(3)	(4)	(5)	(4)	(3)	(5)	(3)	(3)	(6)

(c) Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSE titled "Default (Fixed Price Construction)." (ER 415-1-15)

1.11 REQUIRED INSURANCE SCHEDULE

In accordance with CONTRACT CLAUSE titled "Insurance - Work On A Government Installation," the Contractor shall procure and maintain during the entire period of his performance under this contract the following minimum insurance.

Type Amount

Workmen's Compensation coverage complying with applicable State Statute

Employers' Liability minimum amount of \$100,000.00

General Liability on minimum limits of \$500,000 per
Comprehensive Form of Policy occurrence for bodily injury
which includes, but is not
limited to, insurance for
all work required herein

Comprehensive Automobile minimum limits of \$200,000 per
Liability person and \$500,000 per occurrence
for bodily injury, and \$20,000 per
occurrence for property damage

(End of clause)

1.12 CONTRACTOR-FURNISHED EQUIPMENT DATA

At or before 30 days prior to final inspection and acceptance of the work, the Contractor shall submit the data mentioned in the following subclauses.

- (1) Equipment List. An itemized equipment list showing unit retail value and nameplate data including serial number, model number, size, manufacturer, etc., for all Contractor-furnished items of mechanical equipment, electrical equipment, and fire protection systems installed under this contract.
- (2) Guarantees. A list of all equipment items which are specified to be guaranteed accompanied by a copy of each specific guarantee therefor. For each specific guaranteed item, a name, address, and telephone number shall be shown on the list for subcontractor who installed equipment, equipment supplier or distributor and equipment manufacturer. The completion date of the guarantee period shall correspond to the applicable specification requirements for each guaranteed item.
- (3) Warranty Service Calls. The Contractor shall furnish to the Contracting Officer the names of local service representatives and/or Contractors that are available for warranty service calls and who will respond to a call within the time periods as follows: 4 hours for heating, air-conditioning, refrigeration, air supply and distribution, and critical electrical service systems and food service equipment, and 24 hours for all other systems. The names, addresses, and telephone numbers for day, night, weekend, and holiday service responses shall be furnished to the Contracting Officer and also posted at a conspicuous location in each mechanical and electrical room or close to the unit.

1.13 DATE OF SAFETY AND HEALTH REQUIREMENTS MANUAL (EM 385-1-1)

- (a) The date of the U.S. Army Corps of Engineers Safety and Health Requirements Manual in effect on the date of this solicitation is 3 September 1996. See Section 00700, Contract Clause titled "Accident Prevention."
- (b) Section 06.I of EM 385-1-1 is deleted. Job hazard analysis for confined space entry procedures is still required, as per 01.A.09 of EM 385-1-1. OSHA Standards 29 CFR 1910.146 or 29 CFR 1926 shall apply.
- (c) Before initiation of work at the job site, an accident prevention plan, written by the prime contractor for the specific work and hazards of the contract and implementing in detail the pertinent requirements of EM 385-1-1, will be reviewed and found acceptable by designated Government personnel.

1.14 COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

The Contractor shall comply with OSHA standards as well as the most current edition of the Corps of Engineers General Safety Requirements Manual (EM 385-1-1). The OSHA standards are subject to change and such changes may affect the Contractor in his performance under the contract. It is the Contractor's responsibility to know such changes and effective dates of changes.

1.15 CONSTRUCTION EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE

Whenever a modification or equitable adjustment of contract price is required, the Contractor's cost proposal for equipment ownership and operating expenses shall be as set forth in SPECIAL CLAUSE titled

"Equipment Ownership and Operating Expense Schedule." A copy of EP 1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" dated August 1995 can be ordered from the Government Printing Office (GPO) by calling Telephone No. 202-512-1800.

1.16 SHOP DRAWINGS

The Contractor's attention is directed to clause "Specifications and Drawings for Construction" of the Contract Clauses.

1.17 SUBMITTALS

- (a) Submittal Procedures. See Division One SECTION: SUBMITTAL PROCEDURES FOR DESIGN AFTER AWARD (01331), and SUBMITTAL PROCEDURES FOR CONSTRUCTION (01332).
- (b) Shop Drawings shall be submitted in ample time to secure approval prior to the time the items covered thereby are to be delivered to the site. ENG Form 4025 and 4026 shall be used for the transmittal of shop drawings. Unless otherwise specified, shop drawings shall be submitted not less than 30 days before commencement of fabrication of fabricated items and not less than 15 days before delivery of standard stock manufactured items. materials are stock with the manufacturer, catalog data, including specifications and full descriptive matter, may be submitted as shop drawings. When catalog includes nonapplicable data, the applicable data shall be clearly designated and identified by item number, item name, and name of manufacturer. Shop drawings submitted (including initial and final submittals) shall be reproductions on high quality paper with clear and legible print. Drawings shall generally be bordered a minimum of 25 mm and trimmed to neat lines and unless otherwise specified, the minimum scale shall be 1:20. Units of measure shall match the Contractor's design drawings. Shop drawings quality will be subject to approval. Each shop drawing, including catalog data, shall be identified with a title block including the name of Contractor, contract number, name and location of project, and name of item of work or structure to which the shop drawing applies. Material fabricated or delivered to the site before approved shop drawings have been returned to the Contractor will be subject to rejection. NO CONSTRUCTION OR INSTALLATION SHALL BE DONE FOR ANY ITEM REQUIRING SHOP DRAWINGS, UNTIL ALL SHOP DRAWINGS FOR THAT ITEM HAVE BEEN APPROVED.
- (c) As-Built Shop Drawings: Upon completion of the work under this contract, the Contractor shall furnish five complete sets of prints or one complete set of reproducibles of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the equipment is completed and accepted. The quality of the reproducibles and prints is subject to approval.
- (d) As-Built Drawings: The Contractor shall maintain three separate sets of red-lined, full scale, as-built construction drawings marked up to fully indicate as-built conditions. These drawings shall be maintained in a current condition at all times until completion of the work, and shall be available for review by Government personnel at all times. All variations from the contract drawings, for whatever reason, including those occasioned by modifications, optional materials, and the required coordination between trades, shall be indicated. These variations shall be shown in the same general detail utilized in the contract drawings. In addition, the Contractor shall indicate on the As-Built Drawings, the brand-name, description, location, and quantity of any and all materials used which contain asbestos. The Contractor shall also be responsible for providing

updated CADD files to reflect the current as-built conditions throughout the duration of the project. The CADD design files shall be maintained in the Intergraph Microstation format consistent with the graphic standards established in the CADD contract drawings developed by the Contractor. The Contractor will be provided a copy of the Tri-Service CADD standards to facilitate his efforts in the maintenance of design files. The updated CADD files shall be reviewed by the Government on a monthly basis during the progress payment evaluation. The Contractor shall be prepared to demonstrate the status of the updated CADD files in his on-site office. The as-built utility drawings shall show locations and elevations of all underground new utilities and existing utilities encountered, including dimensions from permanent structures and/or survey locations. The submittal requirements for as-built utility drawings shall be shown as separate activities on the Contractor-prepared network analysis. Upon completion of the work, the marked-up drawings and the updated CADD files shall be furnished to the Contracting Officer on 8 mm tape or CD. In multiphased construction where portions of a system are to be turned over to the user prior to completion of the project, the marked-up drawings for that portion shall be furnished to the Contracting Officer at that time.(MRD ltr 30 Oct 70 and KCD 8 Apr 91)

(e) Fort Riley specific As-Built Requirements: Provide final as-built drawings in CADD Microstation format. Design criteria and referenced drawings furnished by the government (as part of this RFP document) are intended to serve as minimum standard in the preparation of acceptable working drawings and specifications. Applicable details of these drawings shall be incorporated into the working drawings and specifications without reference to their source. Incorporation by reference only is not acceptable. Plan sheet size "E" (28 by 40 inches) is acceptable. Construction drawings shall be provided in both original hard copy and on CD-ROM compact disk and produced in a Bentley Microstation 95 CADD format.

Cover Sheet: A cover sheet for the drawings shall be provided by the contractor and the cover sheet shall include, as a minimum, the project number and title, project location, installation map, contract number, and execution year.

Format: Drawings shall be produced in a Bentley Microstation 95 CADD format and compatible without conversion with the CADD system hardware and software in use at Fort Riley.

CADD files must display as plotted and vice versa (WYSIWYG). Formatting and layering in CADD drawing design files shall be in accordance with the Tri-Service AEC Computer-Aided Design and Drafting (CADD) standards. Half-scale drawings shall be exact half-scale reproductions of full-scale drawings.

CADD Design Files: Design files shall be fully compatible with Bentley Microstation 95 version or earlier version. Plotted files shall provide final deliverable CADD files that display all design file features correctly when plotted on the current Public Works plotters. Currently Public Works (PW) plotters are HP 650c plotters. CADD reference files shall be merged when used to create drawings and cover sheets.

(f) CADD Files: The Government will provide to the Contractor, within 30 calendar days after Notice of Award, copies of the CADD computer files used to develop the Request for Proposal (RFP). These files will be in Intergraph Microstation format. The Government provides no warranty, expressed or implied, of the CADD computer files. The Contractor shall

assume all responsibility to verify the CADD drawing files. The Contractor will not utilize the CADD drawing computer files to resolve dimensional or other discrepancies. The Government will not guarantee the measurable accuracy of the CADD drawing computer files.

- (g) Purchase Orders: Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project, shall be maintained on file at the Contractor's field office for inspection and review by Government representatives. Each purchase order shall (1) be clearly identified with applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating. At the option of the Contractor, the copies of the purchase orders may or may not indicate the price of the articles purchased. (MRD Ltr 22 Oct 74)
- (h) Construction Contractor Color Boards: After acceptance of the design, and in addition to the the AE design color boards, the construction contractor shall submit colorboards for review and conformance to the approved AE design colorboards. The construction contractor colorboards shall be formatted, contain all materials, and meet the requirements as described in the Government supplied edited technical specification Section 09920, CONTRACTOR COLOR BOARDS. The Contractor shall submit a minimum of three (3) complete sets of color boards for review before exterior and interior finish materials are procured or installed.

1.18 SPECIAL REFERENCES

- (a) Shop Drawings. Bidder's attention is directed to SPECIAL CLAUSE titled "Shop Drawings." The basic requirements for Shop Drawings are set forth in the CONTRACT CLAUSES and SPECIAL CLAUSES.
- (b) Approved Equal. Bidder's attention is directed to SPECIAL CLAUSE titled "Approved Equal."
- (c) Payment to Subcontractors. Bidder's attention is directed to SPECIAL CLAUSE titled "Payments to Subcontractors."

1.19 DIFFERENCES IN DRAWINGS

In addition to the provisions of CONTRACT CLAUSE paragraph "Specifications and Drawings for Construction," the structural drawings shall govern in cases where they differ from the architectural drawings.

1.20 DAMAGE TO WORK (1966 MAR OCE)

The responsibility for damage to any part of the permanent work shall be as set forth in the CONTRACT CLAUSE titled "Permits and Responsibilities." However, if, in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood or earthquake, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such work an equitable adjustment pursuant to CONTRACT CLAUSE titled, "Changes," of the contract, will be made as full

compensation for the repairs of that part of the permanent work for which there are no applicable contract unit or lump sum prices. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

1.21 WORK ADJACENT TO ROADS AND HIGHWAYS

Where the construction work is on or adjacent to, or involves hauling over public or private roads, streets, or highways, all herein referred to as "roads," the said roads shall, except as otherwise specified or directed, be kept open for traffic at all times during the construction period. Further, the Contractor shall, during said construction, provide, erect and maintain warning signs, lanterns or torches or other safety devices and, when necessary, provide flagmen for protection of traffic to the satisfaction of the Contracting Officer and local authorities. The Contractor shall keep the right-of-way of the roads free of debris that might be caused to accumulate thereon by his operations, and upon completion of the work, shall clean up the said roads and repair any damage to the roads occasioned by his operations under this contract to the satisfaction of the Contracting Officer and local authorities having jurisdiction. The drainage from the roads shall not be obstructed by the construction work. The Contractor shall be responsible for obtaining and paying for all permits required for operation on all roads.

1.22 APPROVED EQUAL

The drawings and the TECHNICAL PROVISIONS of these specifications may, in some instances, refer to certain items of equipment, material, or article by trade name. References of this type shall not be construed as limiting competition, but shall be regarded as establishing a standard of quality. In this respect, the Contractor's attention is directed to CONTRACT CLAUSE titled "Material and Workmanship."

1.23 SCHEDULE OF WORK

The Contractor's attention is directed to CONTRACT CLAUSE titled "Schedule for Construction Contracts," wherein if, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer.

1.24 UPKEEP OF ROADWAY AREAS WITHIN A MILITARY INSTALLATION WHICH TEH CONTRACTOR USES

In addition to the requirements in CONTRACT CLAUSE titled "Operations and Storage Areas," the Contractor shall comply with the following requirements: Where the construction work is on or adjacent to, or involves hauling over public roads, streets, or highways located on a military installation, all herein referred to as "roads," the said roads shall except as otherwise specified or directed, be kept open for traffic at all times during the construction period. The Contractor shall keep the roads including adjacent construction site free of debris including litter, waste construction material, mud etc., that might be caused to accumulate thereon by his operations, and upon completion of the work, shall clean up the said roads and construction site and repair any damage occasioned with his operations under this contract to the satisfaction of the Contracting Officer. The drainage from the roads shall not be obstructed by the

construction work.

1.25 PROTECTION OF UTILITY LINES

- (a) It shall be the Contractor's responsibility to protect all existing utility lines from damage during excavation for utilities systems. Any damage resulting to existing utility systems shall be repaired by the Contractor, to the satisfaction of the contracting officer, at no additional cost to the Government.
- (b) All requests for access and/or locations must be made through the Contracting Officer's Representative (COR) or Resident Engineer. The Director of Public Works will work directly with the Resident Engineer to provide timely information to the Contractor.
- (C) Not less than 3 or more than 10 workdays prior to the actual day of excavation on each site, the Contractor shall contact Kansas One-Call System, Inc., Toll Free 1-800-344-7233 and obtain a Kansas Dig-Safe Ticket Number. Immediately after obtaining a Kansas Dig-Safe Number the Contractor shall contact Fort Riley Dig-Safe Coordinator at Public Works, Building 338, Telephone 1-785-239-8187, FAX 1-785-239-8188, and accomplish the items listed below. No exceptions to this policy will be tolerated. The Contractor will be held liable for all costs incurred by various underground utility owners for repairs to damaged underground utilities resulting from failure to comply with this procedure.
- (1) Provide Kansas One-Call System Ticket Number.
- (2) Provide company name, name and telephone number of point of contact.
- (3) Provide a site drawing with measurements from nearest building showing depth and nature of work:
- (4) Mark the area to be dug with white paint.

1.26 MODIFICATIONS PRIOR TO DATE SET FOR OPENING BIDS

The right is reserved, as the interest of the Government may require, to revise or amend the specifications or drawings or both prior to the date set for opening bids. Such revisions and amendments, if any, will be announced by an amendment or amendments to this Invitation for Bids. If the revisions and amendments are of a nature which requires material changes in quantities or prices bid or both, the date set for opening bids may be postponed by such number of days as in the opinion of the issuing officer will enable bidders to revise their bids. In such cases, the amendment will include an announcement of the new date for opening bids. (KCD APR 84)

1.27 EXPEDITING NOTICE TO PROCEED

Notwithstanding the requirements of Block 12 on page 00010-1 of SECTION 00010 and SECTION 00100 paragraph titled "Late Submissions, Modifications, and Withdrawals of Bids," in order to expedite award of contract and issuance of NOTICE TO PROCEED, it is requested that an officer of the company or corporation determined to be the successful bidder shall appear in the office of the Commander, Kansas City District, Corps of Engineers, 757 Federal Building, 601 East 12th Street, Kansas City, Missouri, for signing contract documents. Therefore, upon written acceptance of this bid, mailed or otherwise furnished within 60 calendar days after the date

of opening of bids, it is requested that the successful bidder shall within 48 hours after receipt of notification appear in the office of the Commander and execute Notice to Proceed documents, and give performance and payment bonds on Government Standard forms 25 and 25A with good and sufficient surety. It is also requested that the successful bidder furnish insurance certificates required in SPECIAL CLAUSE titled "Required Insurance Schedule" at this time.

1.28 UNEXPECTED HAZARDOUS SUBSTANCES

In the event that suspected hazardous substances are revealed during construction activities, all such construction activities in the immediate area shall be immediately suspended. Hazardous substances for purposes of this specification only, shall be defined as CERCLA hazardous substances, infectious or radioactive wastes, asbestos or oil. The Contractor shall leave the materials undisturbed and shall immediately report the find to the Contracting Officer's Representative (COR) so that proper authorities can be notified. The Contractor shall not resume construction activities in the vicinity of the suspected hazardous substances until written clearance is received from the COR. Identification and removal of any such materials will be conducted in accordance with all Federal, state and local environmental laws and regulations according to the CONTRACT CLAUSE titled "Differing Site Conditions."

1.29 TIMBER DISPOSAL

- (a) Any and all hardwood trees, stems and limbs three (3) inches in diameter or greater that must be removed as a result of construction be stockpiled by the Contractor in the area designated, i.e. 2d and K Street, Camp Funston. Excluded from this requirement are cedar, pine and cottonwood trees, stems and limbs.
- (b) All cedar, pine and cottonwood trees, stems and limbs; all trees, stems and limbs less than three (3) inches in diameter; and all stumps and roots will be taken to the brush habitat site near the Construction Debris(CD) Landfill on Campbell Hill Road.

1.30 FORT RILEY CONSTRUCTION DEMOLITION DEBRIS (C/D) LANDFILL OPERATIONS

The Fort Riley Construction Demolition Debris landfill will have an attendant on duty and be open for normal operations Monday-Friday, 0730-1600. Only construction demolition debris materials will be accepted; any salvageable items shall be turned into DOL, Building 659, or DRMO, Building 1950. POC is the Solid Waste Program Manager, Directorate of Environment and Safety, telephone (785) 239-0398. Only Construction Debris as defined by Kansas Regulations is permitted.

1.31 KANSAS SALES AND USE TAX

In accordance with FAR clause 52.229-3, notice is given that the contract price excludes the Kansas sales tax and compensating (use) tax on all sales of tangible personal property and materials purchased by the Contractor or subcontractors for the construction of projects, including repairing or remodeling facilities, for the United States. In accordance with Kan. Stats. Anno., sec. 79-3606(e), the Contracting Officer will obtain from the State and furnish to the Contractor an exemption certificate for this project for use by the Contractor and subcontractors in the purchase of materials for incorporation in the project and of services. The Contractor

and the subcontractors shall furnish the number of such certificate to all suppliers from whom such purchases are made, and the suppliers shall execute invoices covering the same bearing the number of such certificate. Pursuant to a 1977 Amendment to K.S.A., 1976 Supp., 79-3606(e), effective 1 July 1977, the Contractor is required to retain all invoices for a period of five (5) years during which time these invoices are subject to audit by the Kansas Director of Taxation. Upon completion of the project, the Contractor shall complete the Project Completion Certification (Form STD 77, Rev. 6/77) in duplicate returning one copy to the Contracting Officer, and forwarding the other to the Kansas Director of Taxation. (KCD)

1.32 OUTLINE SPECIFICATIONS

The information and performance criteria provided in the Outline Specification shall be included with, and form a part of, a fully edited specification for the work. In the case of an item of work, not included in the Outline Specification, but required by the Scope of the Work, the Contractor shall provide appropriate specifications either from the Corps of Engineers Guide Specifications or from Industrial Standards.

1.33 FORT RILEY ACCESS CONTROL

Fort Riley is implementing physical security measures in the form of access control. These measures will apply to all contractors and their employees. Fort Riley will require each vehicle to have either a temporary or permanent identification marker attached. It shall be the Contractor's responsibility to monitor and control all company and employee identification markers and comply with Fort Riley's requirements for issuing and returning these markers.

1.33.1 Minimum Requirements

At a minimum, the following requirements will have to be met for access to job sites within the installation:

- a. Contractor
- (1) Current Lists of all employees
- (2) Current Lists of all subcontractors and employees
- (3) Company identification visibly marked on all vehicles
- (4) Current state vehicle registrations
- (5) Proof of liability insurance
- (6) Valid state drivers license
- (7) Picture identification

b. Each Employee

- (1) Contractor-provided picture identification
- (2) Written verification of employment
- (3) If the employee drives a personally owned vehicle to the job site:

Valid state driver's license Current state vehicle registration Proof of liability insurance

1.33.2 ID Cards

Picture identification cards shall be visibly worn at all times while on the installation.

1.33.3 Responsibility for Compliance

The Contractor shall be responsible for complying with all security conditions as determined by Fort Riley and shall be responsible for any additional requirements that may be implemented.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 01290

SDCC - Version 3.2

Aug 2001

KANSAS CITY DISTRICT STRUCTURAL DESIGN CONTROLLING CRITERIA (SDCC)

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1. GENERAL.

1.1 Purpose and Scope.

Design will be completed in accordance with the criteria and instruction documents furnished for this project. A structural controlling criteria listing is provided below, however, the design engineer shall be responsible for incorporation of all applicable information.

1.2 Minimum Requirements.

The criteria established herein will be used as the minimum standards for structural loading and design. If a local code, which also must be followed for design of the building, is more stringent for a particular criterion, the local code may be used as the minimum requirement for that criterion.

1.3 Applicability.

This structural design controlling criteria is applicable to all projects within the Kansas City District military jurisdiction, or as stated otherwise.

2. REFERENCES.

The following are referenced documents within this controlling criteria and does not constitute a complete list of required design reference material.

Note that US Army Corps of Engineers TI publications, Unified Facilities Guide Specifications (UFGS), and other select Corps of Engineers publications are available in electronic format via the TECHINFO internet site http://www.hnd.usace.army.mil/techinfo/.

Information on other US Army Corps of Engineers publications that are not available in electronic format can be found at http://www.usace.army.mil/inet/usace-docs/.

• U.S. Army Corps of Engineers Technical Instructions

UFC 3-310-01	Load Assumptions for Buildings (Jun 2000)
TI 809-02	Structural Design Criteria for Buildings (Sep 1999)
TI 809-04	Seismic Design For Buildings (Jan 1999)
TI 809-07	Design of Cold-Formed Load Bearing Steel Systems and Masonry Veneer/Steel
	Stud Walls (Nov 1998)
TI 809-29	Structural Considerations for Metal Roofing (Aug 1999)
TI 809-30	Metal Building Systems (Aug 1998)
TI 818-02	Design of Deep Foundations (Aug 1998)

• U.S. Army Technical Manuals/Air Force Manuals

TM 5-809-3/AFM 88-3, Ch.3/NAVFAC DM-2.9	Masonry Structural Design for Buildings (Oct 1992)
TM 5-809-6/AFM 88-3, Ch.6	Structural Design Criteria for Structures
	Other than Buildings (Dec 1991)
TM 5-809-12/AFM 88-3, Ch.12	Concrete Floor Slabs on Grade Subjected to
	Heavy Loads (Aug 1987)

TM 5-818-1/AFM 88-3, Ch.7 Soils and Geology Procedures for

Foundation Design of Buildings and Other

Structures (Except Hydraulic Structures)(Oct 1983)

TM 5-822-5/AFM 88-7, Ch.1 Pavement Design for Roads, Streets, Walks

and Open Storage Areas(Incl C1) (Jun 1992)

• U.S. Army Corps of Engineers Design Guide

DG 1110-3-107 Design Guide for U.S. Army Reserve Facilities (Sep 1984)

• U.S. Army Corps of Engineers Engineer Regulations

ER 1110-345-700 Design Analysis, Drawings, and Specifications (May 1997)

• U.S. Army Corps of Engineers Engineer Manual

EM 1110-2-2502 Retaining and Flood Walls (Sep 1989)

American Concrete Institute Building Code

ACI 318-99 Requirements for Structural Concrete and Commentary (ACI

318R-99)

• American Institute of Steel Construction

AISC "Manual of Steel Construction –Allowable Stress Design"

(Latest Edition)

AISC "Manual of Steel Construction –Load & Resistance Factor

Design" (Latest Edition)

• American Iron & Steel Institute

AISI "Cold Formed Steel Design Manual" (Latest Edition)

American Iron & Steel Institute

American Society of Civil Engineers Standard

ASCE 7-98 ASCE Standard, Minimum Design Loads for Buildings and

Other Structures

Federal Emergency Management Agency

FEMA 302 NEHRP Recommended Provisions for Seismic Regulations for

New Buildings and Other Structures

FEMA 303 NEHRP Recommended Provisions for Seismic Regulations for

New Buildings and Other Structures (Part 2- Commentary)

FEMA 361 Design and Construction Guidance for Community Shelters.

(July 2000)

• International Conference of Building Officials

• IBC "International Building Code" (Latest Edition)

National Concrete Masonry Association

TEK Publication 12-2 "The Structural Role of Joint Reinforcement in Concrete

Masonry".

• Steel Deck Institute

SDI Steel Roof Deck Design Manual (Steel Deck Institute

Publication, current edition)

• Steel Joist Institute

SJI Standard Specification, Load Tables and Weight Tables

3. SELECTION OF STRUCTURAL SYSTEM.

3.1 Overall.

The overall structural system to be used will be based on the cost effectiveness of the system and will take into account both the superstructure and foundation. The comparison of competitive systems will also consider the cost factors related to the architectural, mechanical, electrical and other features that comprise the total building. The goals in the selection of a load resisting system are simplicity in the structural framing layout and symmetry in the structural system reaction to design loadings. The selections must consider the need for economy, function, and reliability. Structural systems selected must have deformation characteristics that are compatible with the architectural and other nonstructural building elements and features. Regular structure configuration, continuous and redundant load paths, and system ductility are attributes encouraged. These attributes are required of buildings constructed in high seismic areas.

3.2 Coordination.

The structural engineer shall coordinate with the architect at the inception of the design, and throughout, so that the structural system layout can be properly coordinated with the building architecture to provide the most effective and efficient overall plan.

3.3 Minimum.

The minimum structural system will be selected from TI 809-02 for wind loads and TI 809-04 for seismic loads. Conform to all applicable requirements, general and specific, found in TI 809-02 and TI 809-04 for the structural system selected.

4. LOADING CRITERIA.

- 4.1 General Requirements.
- 4.1.1 For dead and live loads use the latest version of ASCE 7, but no earlier than ASCE 7-98.
- 4.1.2 For snow and wind loads use the latest version of ASCE 7, but no earlier than ASCE 7-98, except as modified by UFC 3-310-01. Use Category III to determine the importance factors and use wind exposure C.
- 4.1.3 For seismic design use TI 809-04. Use seismic group II. Use site class and site characteristic information as recommended in the geotechnical subsurface investigation report. Use the following spectral response coefficients for the locations listed below in Table 4-1. Otherwise, use the zip code for the project location and the USGS Zip Code earthquake ground motion hazard look-up page, which can be found on the internet world wide web address http://geohazards.cr.usgs.gov/eq/.

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Location	S_{s}	S_1
Ft. Leavenworth, KS	0.13	0.06
Ft. Riley, KS	0.20	0.06
McConnell AFB, KS	0.14	0.06
Ft. LeonardWood, MO	0.27	0.13
Whiteman AFB, MO	0.13	0.08

- 4.1.4 For combined loads use the latest version of ASCE 7, but no earlier than ASCE 7-98, and TI 809-04 for load combinations that include seismic loads.
- 4.2 Specific Requirements.
- 4.2.1 If wind loading on the main lateral force resisting system and/or the components and cladding members are greater than seismic loadings and thus are the controlling forces that are used for structural design, the structural seismic detailing requirements given in TI 809-04 must also be used. Both wind and seismic loading for components and cladding must be investigated to determine controlling forces regardless of controlling loads on the main force resisting system.
- 4.2.2 The tributary area "A" to be used in determining the exterior wind pressure coefficients for wall components and cladding shall be the actual loaded area of the structural element under consideration and not the entire area of the loading region in which the member resides. However, for rectangular tributary areas, the width need not be assumed to be less than 1/3 of the length of the area.

4.2.3 The maximum net inward and outward loads used in the design shall be indicated on the Contract Drawings. The design engineer is responsible for calculating the wind loads based on the applicable paragraph Loading Criteria, Specific Requirements. The roof component and cladding loads shall be calculated based on the tributary area of a clip; maximum tributary area of 10 square feet (1 square meter).

- 4.2.4 When determining the internal wind pressure coefficients for buildings, doors and windows shall be assumed opened or closed as required to produce the coefficients that will produce the greatest wind loadings, both inward and outward.
- 4.2.5 For roof slopes less than ½ inch per foot(1:24), include in the design snow load a rain-on-snow surcharge load of 5 psf (0.24 kPa).
- 4.2.6 When the design roof snow or snow plus rain-on-snow loading is less than 20 pounds per square foot (0.96 kPa), a roof live loading for construction and maintenance of 20 pounds per square foot (0.96 kPa)shall be used for design of the structure. The minimum roof live load of 20 psf (0.96 kPa)is used in lieu of and not in addition to the snow or rain plus snow loading.
- 4.2.7 For loading on railings, use the latest edition of ASCE 7 (ASCE 7-98), except that the minimum load for one- and two-family dwellings shall be 50 lb/ft (0.29 kN/m).
- 4.2.8 For electrically driven cranes, a design check shall be made assuming the live loading on the crane is 2.75 times the rated loading. For this loading case, the allowable material stresses may be 90% of the yield stresses. In lieu of this design check, an electric limit switch may be used.
- 4.2.9 For electrically driven permanently installed cranes support use the impact percentages, horizontal force percentages, and fatigue requirements in the Manual of Steel Construction (AISC publication, current edition).
- 4.2.10 Comply with recommendation outlined in OSHA Steel Erection Standard, designated 29 CFR 1926.750.

5. DESIGN CRITERIA.

- 5.1 Foundations.
- 5.1.1 Comply with the applicable recommendations in the geotechnical subsurface investigation report provided by CENWK-EC-GL.
- 5.1.2 Minimum footing depth for frost consideration shall be determined using TI 809-01, but not less than 3 feet (915mm). The bottom of all exterior footings shall also meet

the recommendations in the geotechnical subsurface investigation report provided by CENWK-EC-GL.

- 5.1.3 Where control joints are required in concrete foundation walls, they shall be located where control joints are required in CMU walls above the foundations. Control joints in concrete foundations are not required at all control joints in CMU.
- 5.1.4 In all concrete foundation walls that directly support CMU walls, provide one additional reinforcing bar longitudinally at the top of the concrete wall that is one size greater than the other longitudinal reinforcement. This added bar shall be continuous through all control and construction joints. In all concrete walls with vertical mats of reinforcing in each face, provide two additional bars at the top, one in each face.
- 5.1.5 When masonry veneer is used, the foundation stem wall shall be stepped to form a brick ledge at least 8 inches (200mm) lower than the finished floor.
- 5.1.6 Basement walls (walls mostly below grade that are supported laterally by diaphragms at or near the top and bottom) shall be designed using loadings based on at rest soil pressures. A design check of basement walls shall be made using submerged earth pressure, the free water surface at grade and surcharge loading if present. For this design check, the allowable stresses for the wall materials may be increased to be 90% of the yield stresses or for strength design, a overall load factor of 1.1 may be used.
- 5.1.7 Retaining walls subjected to hydraulic loadings such as flowing water, submergence, wave action, and spray, exposure to chemically contaminated atmosphere, and/or severe climatic conditions, shall be designed using EM 1110-2-2502. Earth retaining walls not subjected to the above mentioned conditions may be designed using TM 5-818-1. A design check of retaining walls shall be made using assumed submerged active earth pressures, free water pressures all around and surcharge loading if present. For this design check, factors of safety for overturning and sliding shall be at least 1.2 and the allowable stresses for all wall materials may be increased to be 90% of the yield stresses or for strength design, a overall load factor of 1.1 may be used.
- 5.1.8 For deep foundations, including concrete drilled pier foundations and, use TM 5-818-1, and TI 818-02.
- 5.1.9 Loading docks, if present shall be designed as retaining walls using at-rest soil values.
- 5.1.10 Structural stoops shall be provided at exterior doorways directly adjacent to exterior concrete slabs. Stoops should have foundations to frost depth and should be rigidly attached to foundation walls.
- 5.2 Concrete.

5.2.1 For concrete design, except for slabs on grade subjected to heavy loads, use TI 809-02, TI 809-04, and ACI 318-99 with the TI's controlling over ACI in cases of conflict. TI 809-04 controls over TI 809-02 in cases of conflict.

- 5.2.2 Do not use keys in horizontal and vertical concrete construction joints. Specify the use of joints roughened to 1/4 inch (6mm) amplitude per ACI 318.
- 5.2.3 For concrete floor slabs-on-grade subjected to heavy moving loads, use TM 5-809-12.
- 5.2.4 For concrete floor slabs-on-grade subjected to post/rack loads, use <u>Designing Floor Slabs on Grade</u> by Boyd C. Ringo and Robert B. Anderson, 1992, chapters 4 and 6 and "Slab Thickness Design for Industrial Concrete Floors on Grade" by Robert C. Packard, Portland Cement Association, 1976 with the latter controlling in cases of conflict.
- 5.2.5 For exterior concrete slabs-on-grade subject to heavy moving loads, use TM 5-822-5.
- 5.2.6 All walls or slabs greater than 9 inches (230mm) thick shall have two or more layers of reinforcing steel.
- 5.3 Masonry.
- 5.3.1 For masonry design (CMU and/or brick), use TM 5-809-3, and TI 809-04 with TI 809-04 controlling in case of conflict.
- 5.3.2 All masonry design will be reinforced masonry. These walls shall be designed as reinforced masonry assuming simply supported vertical spans between diaphragms.
- 5.3.3 If exterior walls have a CMU wythe available due to economic or architectural reasons, the CMU will be used as the vertical and main lateral force resisting systems in lieu of providing steel frames along these walls.
- 5.3.4 Brick veneer with steel stud backup exterior wall systems shall strictly adhere to the criteria and detailing requirements of TI 809-07.
- 5.3.5 In buildings with CMU structural and partition walls, all horizontal and vertical block layout dimensions shall be based on coursing using an 8 inch module when using IP units for design and a 200mm module when using hard metric design. This includes all dimensions for openings as well as the total wall.
- 5.3.6 Steel columns shall not be embedded over all or part of their height in CMU or concrete walls.
- 5.3.7 Single wythe CMU walls permanently exposed to weather shall be fully grouted.

5.3.8 The preferred method of construction of double wythe walls is that the wythes be brought up together. The specification, section 04200 shall be edited to prohibit the use of adjustable ties, to prohibit the construction of one wythe independent of the other, and to require that the wythes be brought up together.

- 5.3.9 For double wythe walls, the maximum cavity width shall be 3.5 inches (89 mm) for ladder type joint reinforcement at 16 inches (400 mm) vertical spacing. The maximum cavity width shall be 5 inches (127 mm) for joint reinforcement vertical spacing of 8 inches (200 mm). Reference National Concrete Masonry Association TEK Publication 12-2 "The Structural Role of Joint Reinforcement in Concrete Masonry".
- 5.3.10 In structural reinforced load bearing CMU walls, vertical reinforcing bars shall be hooked into the top horizontal bond beam at the roof level with a standard ACI 90 degree hook for resistance to roof uplift loads.
- 5.3.11 Structural CMU walls shall be placed in running bond pattern only. Stacked bond pattern for structural walls is not permitted.
- 5.3.12 The use of thin brick veneer is not permitted.
- 5.4 Structural Steel.
- 5.4.1 For structural steel design, use TI 809-04, TI 809-02, and the AISC Manual of Steel Construction, current edition, with the TI's controlling over AISC in cases of conflict. TI 809-04 controls over TI 809-02 in cases of conflict.
- 5.4.2 In buildings or other structures where the main vertical or lateral force resisting systems are structural steel, the main force member connections shall not be made by field welding; ie, there shall be no field welded moment connections, no field welded shear tabs, no field welded bracing connections, etc.
- 5.4.3 Structural steel columns or beams will not be given lateral support by the bottom chords or the bottom chords of extended open web or long span steel joists or joist girders.
- 5.4.4 In buildings where braced frames are used as all or part of the main lateral force resisting system, the stability of the structural system shall not depend on any single member or connection. Redundancy shall be provided either by using multiple bays of tension only X-bracing members or by using bracing members that are capable of both tension and compression if bracing is placed in a single bay. The lateral load resisting system shall comply with the redundancy requirements of TI 809-04.
- 5.5 Metal Building Systems.

5.5.1 Metal Building Systems. For metal building systems, previously referred to as preengineered metal buildings (PEMB), follow the guidance given in TI 809-30 and the criteria presented in UFGS 13120 and/or UFGS 13121 as applicable. The minimum size in plan of the building along with the required clear distance to the bottom of the structural steel should be shown on the contract plans along with any additional minimum clearance requirements. The minimum sizes of all foundation members, including thickness and reinforcing steel sizes and spacings, should be shown along with the minimum footing depth. The Contract Drawings shall show the vertical, horizontal, and moment loading used to compute the minimum footing sizes in a tabular form with the corresponding resultant footing sizes. The Contractor will be required by the specifications to provide the final design of the foundation, if the loading exceeds that shown on the drawings. All concrete floor slabs on grade will be designed using the applicable criteria contained in the section Design Criteria, Concrete above.

- 5.5.2 If the eave height of the metal building system exceeds 20 feet(6 meters), or the rigid frame span exceeds 60 feet(18 meters), or other considerations require, then hairpins shall not be used. Other methods, such as foundation tie beams or at-rest pressures acting on the foundation elements, shall be used to provide resistance to the horizontal loads acting at the base of the metal building system columns. Passive soil pressures will not be used to resist column thrusts unless sufficient supporting justification (including consideration of soil disturbance, moisture conditions, freezing and thawing, and deflection) is provided. Not more than one-half the full passive soil pressure will be used to resist horizontal thrust from columns.
- 5.5.3 The metal building system shall be structurally isolated from other structures (e.g. masonry buildings or arms vaults) located therein.
- 5.5.4 To determine the minimum sizes of the foundation members, the loads of the metal building system columns shall be determined using the different loading combinations of the latest version of ASCE 7 and a suitable computer program. The resultant footing sizes shall be presented in tabular form in a footing schedule with the corresponding design loads on the contract drawings.
- 5.5.5 Where the metal building system will be used to support lateral loads from non-structural elements, such as the top of CMU firewalls, these loads shall be provided on the contract drawings.
- 5.5.6 The allowable methods for resisting lateral loads shall be cross-bracing, rigid frames, or wind columns. All braces used in roofs and walls to transfer or resist load, such as wind loads, seismic loads, and crane thrusts, shall be either standard hot rolled sections or rods. Adjustable rods must be permanently locked in place after final adjustment. Cable bracing is not permitted except for erection purposes.
- 5.5.7 The minimum required lateral force resisting system shall be shown on the roof framing plan, to include the minimum number and location of cross braced bays.

5.5.8 Provide a typical base plate detail on the drawings and edit the specifications to assure compliance with the following minimum base plate requirements:

- At least two anchor bolts are required for base plates with least dimension equal to or less than 12 inches (305mm) and at least four anchor bolts (one near each corner) are required when the least dimension of the base plate is greater than 12 inches (305mm).
- Show the minimum edge distances from the bolt centerline to the edge of the base plate.
- The base plate shall not bear on the slab-on-grade;
- The base plate shall be grouted with non-shrink grout.
- Show the minimum edge distance from the anchor bolts to the concrete pedestal face. Anchor bolts shall not be less than 3/4 inch (M20) in diameter and shall be confined by at least one #4 (#13) reinforcing bar.
- 5.5.9 When SSSMR is a component of a metal building system, the Unified Facilities Guide Specification (UFGS) section 07416 must be used and coordinated with CEGS section 13120 or 13121 as applicable.
- 5.6 Steel Joists.
- 5.6.1 For steel joist design, use Standard Specification, Load Tables and Weight Tables (Steel Joist Institute, current edition).
- 5.6.2 Open web and long span steel joists are designed as laterally supported simple beams under vertical uniform gravity loading. For any other condition, the joist manufacturer must be required to provide the certified design of the joist. The building designer will provide the desired joist depth and spacing along with the required loading diagrams for both upward and downward loadings. The designer will require the manufacturer to select and certify the joist design for the loads specified on the drawings.
- 5.6.3 Open web steel joists used on sloping roofs or floors that exceed a slope of 1/2 inch vertical on 12 inches horizontal (1:24) shall be designed by the manufacturer for that slope. The design shall include the effects of axial loads that result from load components acting parallel to the slope.
- 5.6.4 The bottom chord of open web steel joists shall not be extended to supporting members except as specifically shown on manufacturer's shop or erection drawings.
- 5.6.5 The bottom chord of open web steel joists shall not be used to support suspended

loads.

5.6.6 Field welding to the bottom chord of open web steel joist is not permitted, except as expressly permitted in writing by the joist manufacturer.

- 5.7 Decks, Diaphragms, and Light Gage Steel Members.
- 5.7.1 For the general requirements for the design and detailing of diaphragms use TI 809-04.
- 5.7.2 Diaphragms shall have continuous chord members on all edges and shall have direct positive connection for transferring shear load to all members of the main lateral force resisting system.
- 5.7.3 For steel roof and floor deck design, use Steel Roof Deck Design Manual (Steel Deck Institute Publication, current edition), TI 809-02 and TI 809-04 with TI's controlling the diaphragm design over SDI and TI 809-04 controlling over TI 809-02 in cases of conflict.
- 5.7.4 All screw connections for diaphragms shall be No. 12 or larger. Weld connections of steel deck shall use E60 electrodes.
- 5.7.5 For cold formed structural steel sheet members, strictly adhere to the design guidance provisions of TI 809-07.
- 5.8 *Wood*.
- 5.8.1 For wood design and construction, excluding plywood, use National Design Specification for Wood Construction and Design Values for Wood, TI 809-04, and TI 809-02 with the TI 809-02 controlling over NFPA and TI 809-04 controlling over TI 809-02 in cases of conflict.
- 5.8.2 For plywood properties and design criteria, use current American Plywood Association published brochures, TI 809-04 and TI 809-02 with the TI controlling for diaphragm flexibility determination along with minimum nailing requirements for diaphragms.
- 5.8.3 Fire-retardant treated wood shall not be used for structural applications. This includes, but is not limited to wood trusses, wood framing, and APA rated structural use panels (including plywood). Reference UFGS 06100 for additional information.
- 5.8.4 The use of Oriented Strand Board (OSB) for non-vertical applications is not permitted. For floor and roof sheathing, APA structural rated plywood sheathing only shall be used. Specifically, for floors, use as a minimum, 23/32 inch (18mm) thickness APA rated STURD-I-FLOOR, 24 inch (600mm) on center span rating, Exposure 1,

Tongue and Groove, glued and nailed. In addition, all of the requirements of the APA "Code Plus Floor" shall be met. Ring- or screw-shank nails shall be used.

- 5.9 Roofing.
- 5.9.1 Metal Roofing. Metal roofing systems shall conform to the guidance in TI 809-29, with exceptions and revision contained herein.
- 5.9.1.1 Structural Standing Seam Metal Roof (SSSMR)System
- 5.9.1.1.1 Since there is a wide variety in roof system configurations, fastening systems, and accessories, excessive detailing of the roof system will be avoided. For conventionally engineered buildings, the designer will provide details to include all members below the hold-down clip, including subpurlins and their connections, attachment of wood blocking (if used), and restrictions on the use of thermal barriers or blocks as required.
- 5.9.1.1.2 For conventionally engineered buildings, TI 809-02 requires the design engineer to provide loading diagrams on the Contract Documents, including the dimensions of edge, eave, ridge and corner zones. Loads are to be calculated in accordance with ASCE 7 using a maximum tributary area of 10 square feet (1 square meter). The tributary is based on a maximum panel width and maximum clip spacing. All tributary areas of 10 square feet (1 square meter) or less have the same external pressure coefficient according to ASCE 7 and MBMA-01. The internal pressure coefficient for conventionally engineered buildings and Metal Building Systems shall be determined based on the combination of opened and closed doors and windows which produce the greatest wind loadings. The internal pressure coefficient shall be determined considering large openings, such as aircraft hanger doors, open, unless special provisions are made to assure the openings will be closed at the time of high winds. The minimum internal pressure coefficient per ASCE 7 for installations over open or solid substrates shall be used to account for air infiltration and leakage at the eaves. For Metal Building Systems, select the basic wind speed value from TI 809-01. The importance factor and exposure factors will be obtained from ASCE 7. Loading diagrams for metal buildings systems are required to be submitted with the shop drawings.
- 5.9.1.1.3 For conventionally engineered buildings both purlin and subpurlin design are the responsibility of the designer. The designer will incorporate the criteria in the specifications including the changes in the SPECIFICATIONS paragraph in the design of the framing members. Typical roof sections showing the purlins or subpurlins, including minimum gauge, minimum section properties, minimum connection requirements, bracing provisions for the flanges under both positive and negative bending, and maximum allowable purlin or subpurlin spacing shall be shown on the contract drawings.
- 5.9.1.1.4 For buildings utilizing a steel deck as a roof diaphragm, inverting the steel deck to accommodate the subpurlins is not permitted.

5.9.1.1.5 Roof slopes less than 1½ inch on 12 (1:8) require mechanical seaming and the specifications must be revised to indicate this requirement.

- 5.9.1.1.6 When the SSSMR is a component of a metal building system, the UFGS section 07416 must be used and coordinated with UFGS section 13120 or 13121 as applicable.
- 5.9.1.2 Non-structural applications. A non-structural standing seam metal roof shall be applied over a solid substrate. The designer is responsible for the design of the substrate. Subpurlins are required if insulation is to be placed above the substrate and shall be shown on the Contract Drawings. Attachment of clips through rigid insulation to structure is prohibited. If the substrate is plywood, the design shall include a nailing pattern shown on the Contract Drawings. If the substrate is a metal deck, the deck must be designed for the full wind load in accordance with the provisions of Load Criteria, Specific Requirements. The metal deck shall be designed for concentrated loads and line loads in addition to the appropriate uniformly distributed load. Clips or subpurlins shall be attached through the metal deck to the structure below with bolts or screws. If the clips or subpurlins are attached to the metal deck alone, then bolts (not less than ¼ inch (6mm) diameter with locking washers and nuts), blind screw-type expandable fasteners (FAB-LOK fasteners as manufactured by Fabco Fastening Systems, or approved equal), or blind (pop) rivets (9/32 inch (7mm) diameter, BULB-TITE, as manufactured by Olympic Fastening Systems, Inc., or approved equal) must be used.
- 5.9.2 Elastomeric Roofing (EPDM)
- 5.9.2.1 EPDM roofing shall comply with the criteria UFGS 07530, ELASTOMERIC ROOFING (EPDM). Only the adhesive bonded system will be used. The ballasted system is not permitted. The adhesive bonded system will be used with the following additional requirements
- 5.9.2.2 Require the manufacturer to provide a standard warranty for 10 years.
- 5.9.2.3 According to the guide specifications, insulation under adhered membrane must be attached to the substrate with mechanical fasteners or steep (Type III) insulation. The guide specifications also require that on steel decks, or any slope exceeding 1/2 inch per foot, the first layer of insulation shall be mechanically fastened. For multiple layers of insulation, the preferred practice is to mechanically fasten the bottom board and then adhere the upper boards to lower boards with steep asphalt or an approved adhesive. Mechanical fasteners must be capable of resisting the uplift roof pressures shown on the contract drawings, with appropriate factors of safety for the fasteners and substrate provided. The minimum factor of safety for fasteners is three.
- 5.9.2.4 Require the roofing manufacturer to furnish a certified wind uplift test, Factory Mutual, I-90 rating, for the roofing assembly. An I-90 rating -presently the highest

Factory Mutual rating - is given when a load of 90 psf is reached and maintained for 1 minute. The minimum factor of safety for this system is two. This means that the membrane is considered suitable to sustain a maximum design load of 45 psf with a safety factor of two. There will be many cases where the uplift pressures shown on the wind uplift load diagram on the contract drawings will exceed 45 psf at corners and edges. If the design uplift values exceed 45 psf for the adhesive bonded system, the shortcomings of this type of roofing system shall be reported to the customer. If the customer considers it reasonable to accept the risk of failure and will be responsible to repair the damage as it occurs, then this roofing system may be used where design uplift exceeds 45 psf. If the customer decides that full resistance to design uplift above 45 psf must be provided, another roofing system shall be.

- 5.9.2.5 The contract drawings must include a wind uplift diagram based on criteria from ASCE 7-98, for the entire roof, including the high pressure areas along the edges and corners. A load tributary area of 10 square feet or less should be used in determining wind load coefficients.
- 5.9.2.6 Special attention must be given to the shop approval and evaluation of material to assure that unacceptable materials and systems are not installed. The system shall comply in all respects with the roof assemblies as described in the Factory Mutual Approval Guide. This includes insulation type, fastener types and quantities, and adhesives.
- 5.9.3 Flat roofs shall have a secondary drainage system.
- 5.10 Architectural, Mechanical, and Electrical Equipment.
- 5.10.1 For anchorage and/or isolation requirements for architectural, mechanical and electrical elements, use TI 809-04.
- 5.10.2 For underground storage tanks, the anchorage slabs and tank restraints shall be designed assuming the tanks are empty and the free water surface is at the finished earth grade. The factor of safety of the gravity loads over the buoyant forces shall be at least 1.5.
- 5.11 Special Structures and Conditions.
- 5.11.1 For structures other than buildings, use TM 5-809-6.
- 5.11.2 For Arms Vaults, use DOD 5100.76-M, Chapter 3, except for Arms Vaults located in USARC projects use Design Guide 1110-3-107 dated Sep 84.
- 5.11.3 For Tornado Shelters, use FEMA 361, Design and Construction Guidance for Community Shelters, Dated July 2000.
- 5.11.4 The use of expansion bolt anchors for connections between the elements of the

main lateral force resisting structural system is not permitted.

- 5.11.5 Rack storage design
- 5.11.5.1 The racks shall be designed in accordance with the latest version of the Uniform Building Code. The design and construction of the racks and rack components shall meet requirements to resist vertical and lateral seismic forces.
- 5.11.5.2 Minimum rack requirements for each different storage rack configuration shall be shown on the Contract Drawings. This includes the minimum post base plate size and the anchorage requirements. The A-E is responsible for assuring that the post load assumptions made in designing the slab are not exceeded by the post loads of the actual rack configuration.
- 5.11.5.3 The specifications shall include the minimum acceptable material requirements, load capacity, factor of safety, and submittal requirements for each type of rack storage unit required.

6. DESIGN ANALYSIS.

The Design Analysis Structural Chapter shall be prepared in accordance with ER-1110-345-700 and shall include, as a minimum, the following:

- 6.1 Structural System. The structural system shall be selected from the approved systems listed in TI 809-02. A general description of the structural system for the building and/or truck loading docks including seismic considerations should be given with reasons for selection of the system used and including cost comparisons. Structural system examples include: (1) a building frame system with load bearing and shear walls and interior steel columns supporting steel girders and joists; (2) a moment resisting steel rigid frame system supporting steel beams and joists; (3) a moment resisting concrete frame system with reinforced concrete beams, columns and pan joists; (4) a bearing wall system with reinforced masonry exterior and interior vertical and lateral load bearing walls with steel joists spanning between walls and supporting a flexible steel deck diaphragm.
- 6.2 Roof and Floor System. General method of framing and type of deck including options. Cost comparisons shall be furnished to justify system selected. Address the type, span to depth ratios and classification of the diaphragm. Address features which impact the layout of the structural framing, such as standing seam metal roofing.
- 6.3 Walls and Partitions. Describe composition and general range of thicknesses, seismic design when used, method of providing lateral support for the partitions, and location of load bearing and shear walls.
- 6.4 Foundation System. Foundation design data or assumptions and description of type of foundation system to be used for the buildings and truck loading docks.

6.5 Design Loads. Roof and floor live loads, wind and seismic lateral loads, and unusual dead loads should be given. Truck loads for the design of the truck loading docks.

- 6.6 Design Data. A listing of material properties for all materials to be used in the project, including allowable soil properties (with source notation).
- 6.7 Unusual Design Features. Those which might be controversial should be clearly presented in such a manner that definite approval can be given.
- 6.8 Site Adaptation. When site adapting standard working drawings or designs used at other locations, the data required herein should be limited to design changes resulting from loading, climatic and soil conditions at the new site and/or updating for conformance to current criteria.
- 6.9 List criteria needed to complete final design.
- 6.10 Calculations done using computer programs or spreadsheets shall include sufficient documentation to verify input and output, accuracy of theory, and accuracy of computations.

7. CONTRACT DRAWINGS.

- 7.1 The drawings shall contain in the General Notes a list of the design loading criteria, a list of the strengths of the engineering materials used, the design soil values and any other data that would be pertinent to remodeling and/or future additions. Also, a description of the building structural system shall be given so that the construction contractor will know when the building is self supporting.
- 7.2 The detailing of structural steel framing, including connections, shall be complete. All weld types, weld sizes, bolting layouts, bolt sizes, connection plates and members sizes and locations and stiffener plates sizes and locations shall be shown. Elevations of steel frames used in the lateral load resisting system shall be shown on the contact drawings.
- 7.3 Elevations of all masonry walls showing all openings, lintels, bond beams, horizontal and vertical reinforcement and control joints shall be shown on the structural drawings, including horizontal and vertical dimensions of wall panels, openings, etc. Elevations shall indicate all portions of the masonry wall that are piers or columns as defined in TI 809-04, and indicate the required details. The minimum scale for masonry wall elevations shall be $\frac{1}{4}$ " = 1'-0" (1:50 for metric jobs).
- 7.4 All members, elements and connections that are a part of the main vertical and/or lateral force resisting system must be completely detailed.

7.5 Show locations of control joints for slab-on-grade floors. Show locations of brick expansion joints.

- 7.6 The required joist loading diagrams for both upward and downward loading, computed in accordance with the Loading Criteria General Requirements and Specific Requirements paragraphs, must be shown on the Contract Drawings.
- 7.7 See Section Design Criteria, Roofing in this appendix for standing seam metal roofing loading diagram requirements and minimum detailing requirements.

8. SPECIFICATIONS.

- 8.1 Proprietary materials, fabricated products or construction methods cannot be used. At least three manufacturers must be known before any product can be shown or specified.
- 8.2 Replace paragraph 1.2 Submittals, SD-02 Shop drawings given in the Corps of Engineer's Guide Specification (UFGS) Section 03200, Concrete Reinforcement, with the following:
 - "Complete shop drawings shall be submitted. The shop drawings shall be prepared under the direct supervision of a licensed professional engineer. The shop drawings shall contain his seal and a statement certifying that they are in compliance with the specifications and contract drawings. The shop drawing shall include details of the bending and placing schedule of the steel reinforcement, together with bar schedules indicating the number, size, dimensions, and total length of various bars required. Bar lists and bending diagrams shall be checked for accuracy and completeness before the bars are fabricated. Details of typical supports for reinforcing steel shall be approved prior to placing any concrete. Shop drawings shall show all concrete dimensions, location of all reinforcement, elevations, reinforcing steel clearances, and the location of all construction joints shown on the drawings or proposed by the Contractor. The drawings shall show support details including types, sizes and spacing. Spacing between vertical reinforcing steel shall be shown on the wall elevations. The minimum scale used in the shop drawings shall be 3/8-inch to the foot (1:50). Reinforcement bending details shall conform to the requirements of ACI SP-66."
- 8.3 Concrete for buildings shall comply with the UFGS-03300 including changes through Notice 3 (February 1999) with the exception of subparagraph 1.3.4 Slump and paragraphs 1.4 PROPORTIONS OF MIX, 2.1 ADMIXTURES, 2.2 CEMENTITIOUS MATERIAL, 2.3 AGGREGATE, 3.3 BATCHING, MIXING AND TRANSPORTING CONCRETE, and 3.4 SAMPLING AND TESTING. Specific information for these paragraphs shall be obtained from CENWK-EC-GL for incorporation into the CEGS-03300 format. A Government mix design is required for the concrete used in all projects.

Any project specific requirements which would necessitate changes in the mix design, examples of which include, but are not limited to drilled piers, industrial and other special application floor slabs, multicubical munition structures, and high strength concrete applications, shall be discussed with CENWK-EC-GL. It is the designer's responsibility to bring the need for required changes in the mix design to the attention of both CENWK-EC-GL and CENWK-EC-DS. The results of these discussions, including any deviations from the preceding requirements shall be documented and included in the design analysis.

- 8.4 Masonry shall comply with current version of UFGS-04200, but dated no earlier than July 1992 including changes through Notice 12 (Jun 1999). This specification includes mortar proportion requirements to reduce efflorescence. The specification, section 04200 shall be edited to prohibit the use of adjustable ties, to prohibit the construction of one wythe independent of the other, and to require that the wythes be brought up together in all seismic zones.
- 8.5 The standing seam roofing system shall comply with the current version of CEGS section 07416, but dated no earlier than October 1998 including changes through Notice 2 (Sep 1999), with the exceptions noted below. Earlier versions of the specification are not to be used, if the version of the specification you are editing does not match this number, notify CENWK.
- 8.5.1 Add the subparagraph 1.2.4 Manufacturer's Representative to read "A representative of the SSSMR manufacturer, who is familiar with the design of the roof system supplied and experienced in the erection of roof systems similar in size to the one required under this contract, shall be present at the job site during installation of the SSSMR to assure that the roof system meets specified requirements. The manufacturer's representative shall be either an employee of the manufacturer with at least two years experience in installing the roof system or an employee of an independent installer that is certified by the SSSMR manufacturer to have two years of experience in installing similar roof systems."
- 8.5.3 Revise first sentence in subparagraph 1.3.5 Wind Loads to read, "The design uplift pressures for the roof system shall be [as indicated on the contract drawings.] [computed and applied using a basic wind speed of [___] miles per hour (fastest mile), and importance factor of _____, and exposure factor of _____, an internal pressure coefficient of + 0.55 or 0.55, and a tributary area of 10 square feet.]."

 The uplift pressures shall be computed by the design engineer and shown on the drawings for conventional designed structures. For metal building systems, the manufacturer must compute the uplift pressures using the parameters provided by the design engineer.
- 8.5.4 Change the subparagraph 1.3.7 Framing Members Supporting the SSSMR System to read, "[Structural cold-formed steel framing members and their connections, including minimum required connection capacity shall be as shown on the contract drawings.] [Structural cold-formed steel framing members and their connections shall be designed in

accordance with AISI SG-673. Maximum deflections under applied dead and live load and/or wind load for subpurlins shall not exceed 1/180 times the span length and shall be based on constraint conditions at the supports. Subpurlins shall be designed to span from structural member to structural member. Attachment to a metal deck, if present, is permitted for lateral stability only. Subpurlins must be adequately braced for both positive and negative bending. Subpurlins are required at all clip locations in installations above a metal deck. Attaching clips through rigid insulation to structure is prohibited.]"

- 8.5.5 From the subparagraph 1.3.8 Roof Panels Design, revise next to last sentence to read "Deflections shall be based on panels being continuous across three or more supports, fastener spacing, and the ability of the panel to rotate freely on the support."
- 8.5.6 Add the following to the end of subparagraph 1.3.9 Accessories and Their Fasteners, "The design uplift force for the accessory connections and the factors of safety, shall be as required in subparagraph 1.3.5 Wind Loads."
- 8.5.7 Add paragraph 1.4.1 to read as follows:
- "1.4.1 Concealed Anchor Clip Connection to Building Structure

The tested capacity of fasteners used to connect the concealed anchor clips to [subpurlins] [structural purlins] [metal roof deck] [plywood sheathing] shall be determined from tests supplied by the fastener manufacturer or an independent testing laboratory. Tests shall be performed on fasteners and supporting members that are made from the same materials and are equal or less in size and thickness to the fasteners and supporting members used in the actual roof installation. The maximum uplift loading used in the test shall be the design uplift force multiplied by the factor of safety. The design uplift force and the factors of safety shall be as required in subparagraph 1.3.5 Wind Loads."

8.5.8 Add paragraph 1.4.2 to read as follows:

"[1.4.2 Subpurlin Connection to Building Structure

The tested capacity of fasteners used to connect the subpurlins [to structural purlins] [through metal roof deck to building structure] [to plywood sheathing] shall be determined from tests supplied by the fastener manufacturer or an independent testing laboratory. Tests shall be performed on fasteners and supporting members that are made from the same materials and are equal or less in size and thickness to the fasteners and supporting members used in the actual roof installation. The maximum uplift loading used in the test shall be the design uplift force [given on the drawings for the roof area under consideration] multiplied by the factor of safety. The factors of safety [and the design uplift force] shall be as required in subparagraph 1.3.5 Wind Loads.]"

8.5.9 Change sub paragraph SD-03 ProductData to read, "Design Analysis; [].

Design analysis signed by a Registered Professional Engineer, and submitted for approval prior to beginning of manufacture. The design analysis shall

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include, but not be limited to the following information:

- a. A list of the design loads.
- b. Thermal movements that will result from the specified temperature range. The calculations shall be accompanied by details from the manufacturer that demonstrate how installed concealed anchor clips and other roof system devices will accommodate the required thermal movement.
- c. Concentrated load and roof live load analysis.
- [d. Subpurlin catalog cuts, section property information and sketches to indicate that the subpurlin geometry has been coordinated with the metal deck configuration and that the subpurlins will nest properly in the metal deck flutes.]

NOTE: The following submittal requirements apply to metal building systems only.

- [d. Complete calculations of the support system [,including purlins and/or subpurlins designed in accordance with subparagraph: Framing Members].]
- [e. Wind forces on various parts of the roof. Both positive and negative pressures shall be calculated based on the criteria in subparagraph: Design Conditions and parameters in subparagraph: Wind Uplift Loads. The resultant wind uplift forces and dimensions of the edge and corner zones will be shown on an isometric view of the roof.]"
- 8.5.10 Add the following to the end of paragraph SD-04, Drawings to the end of the paragraph: "The shop drawings shall also include the SSSMR component details that resulted from the design calculations and the wind uplift testing required herein. The shop drawings also shall show the locations and configuration of any thermal spacer blocks or barriers. Subpurlin layouts shall be shown [and the spacing must be coordinated with the metal deck configuration, lap locations, and sidelap configurations]."
- 8.5.11 Add the following items to the end of paragraph SD-06 Reports to read,
 - i. Fastener Test Report (Additional Requirement)- Manufacturer's test report or independent test laboratory report. Tests shall be performed on fasteners and supporting members that are made from the same

materials and are equal or less in size and thickness to the fasteners and supporting members used in the actual roof installation.

- j. Panel Finish Color (Additional Requirement)- Test results shall be submitted for all roofing panels showing the results of testing in accordance with the color finish tests specified in paragraphs 2.6.1 through 2.6.8.
- 8.5.12 Change paragraph SD-04 Samples to include submittal of external clamps or clips used by the manufacturer to increase the load capacity of the roof system. This paragraph must be coordinated with the user of the facility to assure that there is no architectural requirement to limit the use of external clamps.

"External	attachments;	Γ.	1
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External attachment- two samples of every type of permanent external attachment either, clips or clamps, used in the tested system to increase the rated capacity of the roofing system."

- 8.5.13 Revise the second sentence of subparagraph 2.1.1 Steel Panels to read, "Uncoated panels shall be 0.024-inch (0.61 mm) thick minimum, except that areas of the roof subject to design wind uplift pressures of 60 psf (2.87 kPa) or greater shall have a minimum panel thickness of 0.030-inch (0.76 mm)."
- 8.5.14 Add the following to the end of subparagraph 2.3 ACCESSORIES "Thermal spacer blocks and other thermal barriers shall be submitted for approval."
- 8.5.15 Change the first sentence of subparagraph 2.4.1 Screws to read, "Screws for attaching anchor devices shall be not less than No. 14 self-tapping type and not less than No. 12 if self-drilling and self-tapping type."
- 8.5.16 Replace the first sentence of 2.5 SUBPURLINS to read, "Cold formed subpurlins [, when required by the system design,] shall be formed from steel sheet as standard with the manufacturer. The uncoated thickness [shall be as shown on the contract drawings. The subpurlins shall meet the minimum properties shown on the contract drawings [, with the flange configuration designed and coordinated to nest properly in the flutes of the metal deck.]] [may be a minimum of 0.059-inches (1.50 mm) if bolts or structural blind fasteners are used for attachment of the concealed anchor clips to the subpurlins and attachment of the subpurlins to the structure. If screws are used for either attachment, then the minimum uncoated thickness of the subpurlin shall be 0.074-inches (1.85 mm).] Cold formed subpurlins shall have a minimum tensile yield strength of 50,000 psi (345 MPa)."
- 8.5.17 Add to end of subparagraph 3.1.2 Subpurlins "Closer spacing may be required by

the roofing manufacturer to meet the roof uplift loads [shown on the contract drawings] [calculated and submitted with the shop drawings.]"

- 8.5.18 Replace the first sentence of subparagraph 3.1.4 Concealed Anchor Clips to read, "Roof panels shall be fastened to framing members with concealed fastening clips or other concealed devices. Clips shall be attached directly to the building structural system or to the subpurlins with bolts or screws."
- 8.5.19 Add to the end of subparagraph 3.1.4 Concealed Anchor Clips to read, "Closer spacing may be required by the roofing manufacturer to meet the roof uplift pressures [shown on the contract drawings] [calculated and submitted with the shop drawings.] Attachment of clips through rigid insulation to structure is prohibited."
- 8.5.20 Add the following to the end of subparagraph 3.2.1 Board Insulation with Blanket Insulation and to subparagraph Blanket Insulation 3.2.2, "Thermal blocks shall not be placed in between the concealed anchor clips and the subpurlins or supporting structure."

--End-

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SECTION 01312A

QUALITY CONTROL SYSTEM (QCS)

PART 1 GENERAL

1.1 GENERAL

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Import/Export of Data

1.1.1 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.2 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01320A, PROJECT SCHEDULE, Section 01330, SUBMITTAL PROCEDURES, and Section 01451A, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on 3-1/2 inch high-density diskettes or CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.3 SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

HARDWARE

IBM-compatible PC with 200 MHz Pentium or higher processor

32+ MB RAM

4 GB hard drive disk space for sole use by the QCS system

3 1/2 inch high-density floppy drive

Compact disk (CD) Reader

Color monitor

Laser printer compatible with HP LaserJet III or better, with minimum $4\,$ MB installed

memory.

Connection to the Internet, minimum 28 BPS

SOFTWARE

 $\,$ MS Windows 95 or newer version operating system (MS Windows NT 4.0 or newer is

recommended)

Word Processing software compatible with MS Word 97 or newer

Internet browser

The Contractor's computer system shall be protected by virus protection software that is regularly

 $$\operatorname{upgraded}$ with all issued manufacturer's updates throughout the life of the contract.

Electronic mail (E-mail) compatible with MS Outlook

1.4 RELATED INFORMATION

1.4.1 QCS User Guide

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website; the Contractor can obtain the current address from the Government. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.4.2 Contractor Quality Control (CQC) Training

The use of QCS will be discussed with the Contractor's QC System Manager during the mandatory CQC Training class.

1.5 CONTRACT DATABASE

Prior to the pre-construction conference, the Government shall provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by files attached to E-mail. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.6 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government shall be submitted by E-mail with file attachments, e.g., daily reports, schedule updates, payment requests. If permitted by the Contracting Officer, a data diskette or CD-ROM may be used instead of E-mail (see Paragraph DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM). The QCS database typically shall include current data on the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver Contractor administrative data in electronic format via E-mail.

1.6.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format via E-mail.

1.6.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.6.1.4 Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.6.2 Finances

1.6.2.1 Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.6.2.2 Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment requests with supporting data by E-mail with file attachment(s). If permitted by the Contracting Officer, a data diskette may be used instead of E-mail. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01451A, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.6.3.1 Daily Contractor Quality Control (CQC) Reports

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01451A, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of either mode of submittal shall be coordinated with the Government representative. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.6.3.2 Deficiency Tracking

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.6.3.3 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.4 Accident/Safety Tracking

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 200.

1.6.3.5 Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.6.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

1.6.4 Submittal Management

The Contractor will provide the initial submittal register, ENG Form 4288, SUBMITTAL REGISTER, in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using QCS. RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.6.5 Schedule

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Contract Clause "Schedules for Construction Contracts", or Section 01320A, PROJECT SCHEDULE, as applicable. This schedule shall be input and maintained in the QCS database either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01320A PROJECT SCHEDULE). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data, and schedule data using SDEF.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.8 DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is by E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of computer diskettes or CD-ROM for data transfer. Data on the disks or CDs shall be exported using the QCS built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

1.8.1 File Medium

The Contractor shall submit required data on 3-1/2 inch double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.8.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.8.3 File Names

The Government will provide the file names to be used by the Contractor with the QCS software.

1.9 MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

* * * * * *

(End of Section)

SECTION 01320

PROJECT SCHEDULE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of the specification to the extent referenced. The publications are referenced in the text by basic designation only.

ENGINEERING REGULATIONS (ER)

ER 1-1-11

(1995) Progress, Schedules, and Network Analysis Systems

1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

1.3 PRE-SUBMISSION CONFERENCE

After the Notice to Proceed and after submission but prior to acceptance by the Government of the Contractor's Initial NAS, the Contractor shall meet with the Contracting Officer or his Authorized Representative and discuss the Contractor's initial NAS and scheduling management system. As a minimum the Contractor's Project Manager, Project Scheduler, Contractor Quality Control Manager, and Project Superintendent shall attend. During the meeting, a mutual understanding of all system details shall be developed, including the utilization of system functions, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Representatives and the Resident Management System. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the scheduling management system or procedures that may require corrective action by the Contractor.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute

in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel will result in an inability of the Contracting Officer to evaluate Contractor's progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

3.3.2 Level of Detail Required

The Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule:

3.3.2.1 Activity Durations

Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 days).

3.3.2.2 Procurement Activities

Tasks related to the procurement of materials or equipment shall be included as separate activities in the project schedule. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, and delivery.

3.3.2.3 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections (preparatory, initial, pre-final, final), utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.2.4 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

3.3.2.5 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

3.3.2.6 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number. Whenever possible, changes shall be added to the schedule by adding new activities. Existing activities shall not normally be changed to reflect modifications.

3.3.2.7 Bid Item

All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

3.3.2.8 Phase of Work

All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

3.3.2.9 Category of Work

All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited, to the procurement chain of activities including such items as submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

3.3.2.10 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to, a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from NTP to the contract completion date.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

3.3.3.3 Early Project Completion

In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted in the narrative report at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period.

3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

3.3.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

3.3.4.2 End Phase

The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

3.3.4.3 Phase X

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

3.3.6 Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contractor shall propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

3.3.7 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 60 calendar days shall be submitted for approval within 20 calendar days after the NTP is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 60 calendar days after NTP.

3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 40 calendar days after NTP. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

3.4.4 Standard Activity Coding Dictionary

The Contractor shall use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, initial submission, and every periodic project schedule update throughout the life of the project:

3.5.1 Data Disks

Two data disks containing the project schedule shall be provided. Data on one of the disks shall adhere to the SDEF format specified in ER 1-1-11, Appendix A. The other shall be a backup disk formulated by the scheduling software.

3.5.1.1 File Medium

Required data shall be submitted on $3.5~\mathrm{disks}$, formatted to hold $1.44~\mathrm{MB}$ of data, under the MS-DOS Version $5.~\mathrm{or}~6.\mathrm{x}$, unless otherwise approved by the Contracting Officer.

3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Preliminary, Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the MS-DOS version used to format the disk.

3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

3.5.2 Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the 4 most critical paths, a description of current and anticipated problem areas or delaying

factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis.

3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in progress or completed.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number. Preceding and succeeding activities shall include all information listed above in paragraph Schedule Reports. A blank line shall be left between each activity grouping.

3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the NTP until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

3.5.4.5 Reports

The reports specified above shall be submitted in the original and two

copies and additionally as report specifications in the NAS data disk generated by the scheduling software. The paper reports shall be collated stapled or bound individually.

3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

The critical path shall be clearly shown.

3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.5.5.6 Submission of Diagrams and S-Curves The diagrams shall be submitted in the original and one copy and additionally as a graphic report specification on the NAS data disk generated by the NAS software.

The S-Curves shall be submitted in the original and two copies and additionally as a tabular report specification on the NAS data disk.

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the Preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions, and adjustments as appropriate.

3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of the Contracting Officer. As a minimum, the Contractor shall address the following items on an activity by activity basis during each progress meeting.

3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed .

3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations shall be based on Remaining Duration for each activity.

3.6.3.3 Cost Completion

The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

3.6.3.4 Logic Changes

All logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule which does not represent the actual or planned prosecution and progress of the work.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, or any interim milestone date, the Contractor shall furnish the following for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the

contract: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the contract completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
 - b. A brief explanation of the causes of the change.
 - c. An analysis of the overall impact of the changes proposed.
 - d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

3.7.3 Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

3.8 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the

revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

-- End of Section --

SECTION 01331

SUBMITTAL PROCEDURES FOR DESIGN AFTER AWARD (DESIGN/BUILD)

PART 1 GENERAL

1.1 SCHEDULING

The Contractor shall provide a schedule of the design submittal phases. Design submittals are required at the concept (35%), preliminary (60%), and final (100%) design stages, and at the corrected 100% design complete stage. The submittal procedures and submittal format for each design stage are listed hereinafter. The Contractor shall reflect the design submittal phases in the progress charts. Partial submittals shall not be accepted.

1.1.1 Contractor Design Schedule

Within 21 days after Notice to Proceed, the Contractor shall submit, for approval, a complete design schedule with all submittals and review times indicated in calendar dates. The Contractor shall update this schedule monthly.

1.1.2 Government Review

After receipt of the design submittal, the Government will be allowed fifteen (15) days each to review and comment on the 35% and 60% design submittals and twenty-two (22) days to review and comment on the 100% design submittal, except as noted below. For each design review submittal, the COR will furnish the Contractor comments from the various design sections and from other concerned agencies involved in the review process. The review will be for conformance with the technical requirements of the solicitation and the Successful Offeror's (Contractor's) RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. The Contractor shall furnish disposition of all comments, in writing, with the next scheduled submittal. The Contractor is cautioned in that if he believes the action required by any comment exceeds the requirements of this contract, that he should take no action and notify the COR in writing immediately. Review conferences will be held for each design submittal at Fort Riley. The Contractor shall bring the personnel that developed the design submittal to the review conference. These conferences will take place the week after the final day of the review period.

1.1.3 Fast Track Construction

The contractor may chose to develop a "Fast Track" Design submittal process to enable early construction start. If a fast track method of construction is implemented, all requirements for a fast track submittal, as described in Section 01019, DESIGN AFTER AWARD - 35% must be provided for review and acceptance by the Government. The acceptance of all parts of this

submittal is required before any site work or construction can begin. Any rework required, as a result of a design error or contractor change discovered later in the design process, will be corrected at the contractor expense. The Contractor may begin construction on portions of the work for which the Government has reviewed the Final Design Submission and has determined satisfactory for purposes of beginning construction. The COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

1.1.4 Late Design Submittals

If a design submittal is over one (1) day late in accordance with the latest design schedule, the Government review period will be extended 7 days. The review conference will be held the week after the new review period. Submittal date revisions must be made in writing at least one (1) week prior to the effected submittal.

1.1.5 Review Method

All review comments shall managed and documented in electronic format utilizing the web-based "Dr. Checks" software program, Enterprise Version, available at website http://65.204.17.188/projnet/home/version1/index.cfm/ at no cost to the Contractor. Dr. Checks does not require special software but does require 128 bit encryption and Microsoft Internet Explorer 5.0 or above. The Kansas City District Project manager, through the COR, shall provide access and office passwords to the contractor. All review comments shall be posted in Dr. Checks and Contractor responses to those comments shall be provided in Dr. Checks.

1.2 DESIGNER OF RECORD

The Contractor shall identify, for approval, the Designer of Record for each area of work. One Designer of Record may be responsible for more than one area. All areas of design disciplines shall be accounted for by a listed, registered Designer of Record. The Designer(s) of Record shall stamp, sign, and date all design drawings under their responsible discipline at each design submittal stage.

1.3 SUBMITTAL FORMAT

All submittal documents including drawings and calcualations shall be provided in hard copy form.

1.3.1 Units of Measure

The design and construction of this project shall be based on, and shown as, "HARD METRIC" units of measurement (reference Metric Criteria (EIRS Bulletin 97-01) at http://www.hnd.usace.army.mil/techinfo and specification Section 01415, METRIC MEASUREMENTS.

1.3.2 Design Analysis

Present the design analysis on 8-1/2-inch by 11-inch paper except that larger sheets may be used if required for graphs or other special calculation forms. All sheets shall be in reproducible form. Side margins shall be 1-inch minimum to permit side binding and head to head printing. Bottom margins shall be 1-1/4-inches, with page numbers centered 1-inch

from the bottom. The design analysis shall be developed in accordance with Engineering Regulation ER 1110-345-700. The material may be typewritten, handlettered, handwritten, or a combination therof, providing it is legible.

1.3.2.1 Organization

Assign the several parts and sheets of the design analysis a sequential binding number and bind them under a cover indicating the name of the facility and project number, if applicable. The title page shall carry the designation of the submittal being made. The complete design analysis presented for final review with the final drawings and specifications shall carry the designation "FINAL DESIGN ANALYSIS" on the title page.

1.3.2.2 Calculations

Design calculations shall be a part of the design analysis document. Calculations for each discipline shall be bound separately and provided as appendices to the design analysis. Present the design calculations in a clean and legible form incorporating a title page and index for each volume. Furnish a table of contents, which shall be an index of the indices, when there is more than one volume. Identify the source of loading conditions, supplementary sketches, graphs, formulae, and references. Explain all assumptions and conclusions. Calculation sheets shall carry the names or initials of the computer and the checker and the dates of calculations and checking. No portion of the calculations shall be computed and checked by the same person.

1.3.2.3 Automatic Data Processing Systems (ADPS)

When ADPS are used to perform design calculations, the design analysis shall include descriptions of the computer programs used and copies of the ADPS input data and output summaries. When the computer output is large, it may be divided into volumes at logical division points. Precede each set of computer printouts by an index and by a description of the computation performed. If several sets of computations are submitted, they shall be accompanied by a general table of contents in addition to the individual indices. Preparation of the description which must accompany each set of ADPS printouts shall include the following:

- A. Explain the design method, including assumptions, theories, and formulae.
- B. Include applicable diagrams, adequately identified.
- C. State exactly the computation performed by the computer.
- D. Provide all necessary explanations of the computer printout format, symbols, and abbreviations.
- E. Use adequate and consistent notation.
- F. Provide sufficient information to permit manual checks of the results.

1.3.3 Drawings

Prepare all drawings so that they are well-arranged and placed for ready reference and so that they present complete information. The Contractor shall prepare the drawings with the expectation that the Corps of

Engineers, in the role of supervision, will be able to construct the facility without any additional assistance from the Contractor. Drawings shall be complete, unnecessary work such as duplicate views, notes and lettering, and repetition of details shall not be permitted. Do not show standard details not applicable to the project, and minimize unnecessary wasted space. Do not include details of standard products or items which are adequately covered by specifications on the drawings. Detail the drawings such that conformance with the RFP can be checked and to the extent that shop drawings can be checked. Do not use shop drawings as design drawings. Submit an index of drawings with each submittal. The COR will furnish the Contractor file, drawing and specification numbers and CADD file names for inclusion in the title blocks of the drawings.

1.3.3.1 Format

Drawings shall be provided in hard copy, true half scale, on 11-inch by 17-inch paper size. Full scale drawings shall be 24-inches by 36-inches. All drawings shall utilize the Kansas City District border file as provided by the COR. Drawings shall be created in electronic CADD format utilizing Microstation J. Drafting Standards shall conform to Version 2 of the A/E/C CADD Standards available at website:

http://tsc.wes.army.mil/products/standards/aec/aecstdweb.asp/.

1.3.3.2 Final CADD Files

The use of Reference files and Xrefs during the design stage is up to the discretion of the designers. All CADD files at Design Complete submittal shall be free-standing, independent files, and not supported by reference files. All Reference files (MicroStation) shall be removed at Design Complete submittal.

1.3.3.3 Drawing Scales

Unless otherwise noted, drawing scales shall be selected based on legibility at 11 x 17 paper size reproduction. The building drawings shall consist of 1:100 scale minimum floor plans and elevations and other visual information as required. Draw building wall sections at a minimum of 1:20 scale. Scales for enlarged plans, details an other drawing types shall follow A/E/C CADD Standards unless otherwise noted.

1.3.4 Specifications

The Contractor shall submit an edited specification providing the material requirements for all products used in construction. The Contractor shall utilize the Unified Facilities Guide Specifications (UFGS) available at the following website: http://www.ccb.org/ufgs/ufgs.htm/. Edited guide specifications shall comply with the minimum standards provided in the UFGS guide specifications with regard to submittals, quality, testing, fabrication, installation, and safety. Each edited specification shall include:

- A. All submittal requirements as listed in the UFGS guide specifications for materials used.
- B. All information and requirements provided in any related outline specification as provided as part of this contract.
- C. Deletion of all marked-out or redlined text and inclusion of all inserted text.

1.3.4.1 Specification Format

Specifications shall be provided in "SpecsIntact" (Specifications-Kept-Intact) format. SpecsIntact is an automated system for preparing standardized facility construction specifications used worldwide by NASA, U.S. Naval Facilities Engineering Command (NAVFAC), and the U.S. Army Corps of Engineers (USACE). The electronic program can be accessed at website: http://si.ksc.nasa.gov/specsintact/.

1.3.4.2 Submittal Register For Specifications

The Contractor shall develop the submittal requirements for construction during the design phase of the contract using the Resident Management System (RMS) software. A copy of the RMS software and the user's manual shall be provided to the Contractor by the COR. The Contractor shall prepare a submittal register for each section of the specifications for the submittal requirements of that section utilizing the Submittal Register on ENG Form 4288. The Contractor shall be responsible for listing all required submittals necessary to insure the project requirements are complied with. The Register shall identify submittal items such as shop drawings, manufacturer's literature, certificates of compliance, material samples, guarantees, test results, etc. that the Contractor shall submit for review and/or approval action during the life of the construction contract. The Contractor shall place all the Submittal Register pages in an appendix of the final specifications.

1.3.5 Architectural (AE) Design Color Boards

Architectural (AE) design color boards shall be provided in the format and to the requirements prescribed in specification Section 09920, CONTRACTOR COLOR BOARDS, paragraphs 2.1 and 3.1.

1.4 SUBMITTAL CONTENT

The required content for each submittal stage is described in the following specification sections:

- A. Section 01019, DESIGN AFTER AWARD 35% for the Concept Conformance Review Submittal (35%)
- B. Section 01020, DESIGN AFTER AWARD 60% for Preliminary Conformance Review Submittal (60%)
- C. Section 01021, DESIGN AFTER AWARD 100% for Final Conformance Review Submittal (100%)

1.4.1 Corrected 100% Complete Submittal

A corrected 100% design complete submittal, incorporating all approved review comments, shall be made eight (8) days following the completion of the final conformance review submittal meeting. This submittal shall include the following items in hard copy form:

- A. Annotated 100% review comments.
- A. Design Analysis in corrected 100% complete form.

- B. Corrected 100% complete design drawings.
- C. Corrected 100% complete final specifications.

1.4.1.1 Pending Design Revisions

If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted with the Design Complete Submittal and are satisfactory to the Government.

1.5 QUANTITY OF DESIGN SUBMITTALS

The documents which the Contractor shall submit to the Government for each submittal are listed and generally described hereinafter. Unless otherwise indicated, the Contractor shall submit thirty (30) copies of each item required at the Concept (35%), Preliminary (60%), and Final (100%) Conformance Review Submittal stages. At the Corrected 100% Submittal, the Contractor shall also submit five (5) complete full size sets of drawings, five (5) complete half size sets and two copies of CADD files in Intergraph format, five (5) sets of the specifications and two (2) copies on floppy disks in ASCII.

1.5.1 Design Analysis Calculations

Design Analysis Appendices containing calculations shall not be required to accompany all copies of the design analysis. A total of eight (8) copies of the appendices shall be provided at each submittal stage to addresses as provided by the COR.

1.6 MAILING OF DESIGN SUBMITTALS

Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract. The submittals shall be mailed to eleven (11) different addresses.

1.6.1 Transmittal Letter

Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

1.7 COORDINATION

1.7.1 Written Records

Prepare a written record of each design site visit, meeting, or conference, either telephonic or personal, and furnish within five (5) working days copies to the Contracting Officer and all parties involved. The written record shall include subject, names of participants, outline of discussion, and recommendation or conclusions. Number each written record for the particular project under design in consecutive order.

1.7.2 Design Needs List

Throughout the life of his contract the Contractor shall furnish the COR a

biweekly "needs" list for design related items. This list shall itemize in an orderly fashion design data required by the Contractor to advance the design in a timely manner. Each list shall include a sequence number, description of action item, name of the individual or agency responsible for satisfying the action item and remarks. The list will be maintained on a continuous basis with satisfied action items checked off and new action items added as required. Once a request for information is initiated, that item shall remain on the list until the requested information has been furnished or otherwise resolved. Copies of the list will be mailed to both the Administrative Contracting Officer and the agencies tasked with supplying the information.

-- End of Section --

SECTION 01332

SUBMITTAL PROCEDURES FOR CONSTRUCTION (DESIGN-BUILD)

PART 1 GENERAL

1.1 SUBMITTAL DEFINITIONS

The submittals described below are those required and further described in other sections of the specifications. Submittals required by the CONTRACT CLAUSES and other nontechnical parts of the contract are not included in this section.

Submittals required are identified by SD numbers and titles as follows:

- SD-01 Preconstruction Submittals
- SD-02 Shop Drawings
- SD-03 Product Data/Manufacturers' Instructions
- SD-04 Samples
- SD-05 Design Data
- SD-06 Test Reports
- SD-07 Certificates
- SD-10 Operation and Maintenance Data

1.2 SUBMITTAL CLASSIFICATION

1.2.1 Government Approved Construction Submittals

Government approval is required for any deviations from the Solicitation or Accepted Proposal and other items as designated by the Contracting Officer's Representative. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.2.2 Government Reviewed Extension of Design

Government review Is required for extension of design construction submittals, used to define contract conformity, and for deviation from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the Designer of Record design documents do not Include enough detail to ascertain contract compliance. Government review is not required for extensions of design such as structural steel or reinforcement shop drawings.

1.2.3 Information Only

All submittals not for Government approval will be For Information Only (FIO). They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 GOVERNMENT REVIEWED OR "APPROVED" SUBMITTALS

The Contracting Officer's Representative (COR) conformance review or approval of submittals shall not be construed as a complete check, but will Indicate only that the design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal. Government Review or approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Design and CQC requirements of this contract is responsible for design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work. After submittals have been reviewed for conformance or approved, as applicable, by the COR, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution Is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the COR, obtain the Designer of Record's approval, when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Any "Information Only" submittal found to contain errors or unapproved deviations from the Solicitation or Accepted Proposal shall be resubmitted as one requiring "approval" action, requiring both Designer of Record and Government approval. CAUTION: The Contractor is cautioned that for each Contractor's resubmittal required beyond the initial submittal and one resubmittal for corrections required by the Contracting Officer, the Contracting Officer will assess Administrative Deduction in the amount of \$500.00 from the progress payments due the Contractor. If the Contractor considers any correction indicated by the Government on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the COR.

1.5 WITHHOLDING OF PAYMENT

No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or Information Only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the Specifications. The COR may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, the Contractor's

Quality Control (CQC) representative, and the Designer of Record, as applicable, above shall check, approve and stamp, sign, and date each item, indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts, or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

The Contractor's Designer(s) of Record shall develop a complete list submittals during design. The Designer of Record shall identify required submittals in the specifications. The list is to be used in preparing ENG Form 4288 Submittal Register or a computerized equivalent. The list is not all inclusive and additional submittals may be required by other parts of the contract. The contractor is required to complete ENG Form 4288 (including columns "a" through 'Y') and submit to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The approved submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. The submit dates and need dates used in the submittal register shall be coordinated with dates in the Contractor-prepared progress schedule. Updates to the submittal register showing the contractor action codes and actual dates with government action codes and actual dates shall be submitted monthly or until all submittals have been satisfactorily completed. When the progress schedule is revised, the submittal register shall also be revised and both submitted for approval.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time. (a minimum of thirty (30) calendar days exclusive of mailing time) shall be allowed and shown on the register for Government review or approval. No delay damages or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be for transmitting both Government-approved and Information Only submittals in accordance with the instructions on the reverse side of the form. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

Submittals will be made as follows:

3.5.1 Procedures

The Contractor shall submit for approval five (5) copies of all submittals to the Contractor's Designer of Record (CDOR). For all military projects an additional copy of all submittals (for information only) related to fire protection/detection systems shall be submitted to the Public Works Office for review by the Fire Chief. The mailing address for these submittals shall be obtained at the preconstruction conference. Items not to be submitted in quintuplicate, such as samples and test cylinders, shall be submitted accompanied by five (5) copies of ENG Form 4025.

3.5.1.1 Government Conformance Review Submittals

After the Contractor's Designer of Record (CDOR) review of each submittal is complete, the CDOR shall forward three copies of each submittal, including all For Information Only (FIO) submittals, to the Government for the Government's conformance review. This submittal shall include the accompanying ENG Form 4025 and any CDOR review comments. This submittal must be provided to the Government prior to the installation of the materials listed in the submittal. One copy shall be sent to the Engineering and Construction Division (EC) addressed as follows:

US Army Engineering District, Kansas City ATTN: CENWK-EC-D Federal Building, 601 East 12th Street Kansas City, Missouri 64106-2896

Two copy shall be sent to the Engineering and Construction Division (EC) addressed as follows:

Fort Riley Area Office Box 2189 Fort Riley, KA 66442

3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. As stated above, the Contractor's Designer of Record's approval is required for any proposed deviation. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved Submittal Register so the material needed date is not threatened.

3.7 GOVERNMENT CONFORMANCE REVIEW AND APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Copies of the submittal will be retained by the COR and copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record

approved submittals, the submittals will be so identified and returned, as described above.

3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the COR is not required on Information Only submittals. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the COR from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. Provide distribution to the Government in accordance with Paragraph 3.5.1.1, prior to the installation of any materials in the submittal.

3.9 STAMPS

Stamps used by the Contractor's Designer of Record and the Contractor's designated Quality Control person on the submittal data to certify that the submittal meets contract requirements shall be similar to the following (use two stamps for submittals reviewed by both):

CONTRACTOR (Firm Name)

	_ Approved
	_ Approved with corrections as noted on submittal data
and/or attach	ned sheet(s).
SIGNATURE: _	
TITLE:	Designer of Record
D3.000.	
DATE:	
	CONTRACTOR
	(Firm Name)
	Approved
	Approved with corrections as noted on submittal data
and/or attach	
SIGNATURE: _	
יידייד ביי	Designer of Record
DATE:	
End of S	Section

SECTION 01355

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) U.S. Army Corps on Engineers Safety and Health Requirements Manual
WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.5 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.6 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.7 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.8 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.9 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

1.6 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals not having a "GA" designation are for information only. When used, a designation following the "GA" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Environmental Protection Plan; GA-RE.

The Environmental Protection Plan.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor

considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan shall be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
- d. Description of the Contractor's environmental protection personnel training program.
- e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.
- f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.
- g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.
- h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

- i. Drawing showing the location of borrow areas.
- j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:
 - 1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and the local Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.
 - 2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.
 - 3. Training requirements for Contractor's personnel and methods of accomplishing the training.
 - 4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
 - 5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.
 - 6. The methods and procedures to be used for expeditious contaminant cleanup.
- k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic meters or tons along with the percent that was diverted.
- 1. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to

participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

- m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.
- n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.
- o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.
- p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.
- q. A pesticide treatment plan shall be included and updated, as information becomes available. The plan shall include: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional specific requirements.

1.7.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached, as an appendix, to the Environmental Protection Plan.

1.8 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.9 SPECIAL ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with the special environmental requirements included at the end of this section.

1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer, and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

The Contractor shall be responsible for obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations.

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations shall be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as indicated on the drawings. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. Any temporary measures shall be removed after the area has been stabilized.

3.2.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and

temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.3.1 Cofferdams, Diversions, and Dewatering Operations

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure shall be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body. The Contractor shall comply with the State of Missouri water quality standards and anti-degradation provisions.

3.3.2 Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State, and local governments.

3.3.3 Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands. The Contractor shall be responsible for the protection of wetlands shown on the drawings in accordance with paragraph ENVIRONMENTAL PERMITS, REVIEWS, AND APPROVALS. Authorization to enter specific wetlands identified shall not relieve the Contractor from any obligation to protect other wetlands within, adjacent to, or in the vicinity of the construction site and associated boundaries.

3.4 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded

or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of Missouri rules.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.5.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.5.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 150 mm of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.5.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The

Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within 60 days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.

3.5.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Storage of fuel on the project site shall be accordance with all Federal, State, and local laws and regulations.

3.5.5 Waste Water

Disposal of waste water shall be as specified below.

- a. Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water by collecting and placing it in a retention pond where suspended material can be settled out and/or the water can evaporate to separate pollutants from the water. The site for the retention pond shall be coordinated and approved with the Contracting Officer. The residue left in the pond prior to completion of the project shall be removed, tested, and disposed off-Government property in accordance with Federal, State, and local laws and regulations. The area shall be backfilled to the original grade, top-soiled and seeded/sodded.
- b. For discharge of ground water, the Contractor shall surface discharge in accordance with all Federal, State, and local laws and regulations.
- c. Water generated from the flushing of lines after hydrostatic testing shall be land applied in accordance with all Federal, State, and local laws and regulations for land application.

3.6 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

3.7 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.8 BIOLOGICAL RESOURCES

The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.9 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.10 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.11 MILITARY MUNITIONS

In the event the Contractor discovers or uncovers military munitions as defined in 40 CFR 260, the Contractor shall immediately stop work in that area and immediately inform the Contracting Officer.

3.12 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands,

and endangered species and their habitat that are known to be in the area.

3.13 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

SECTION 01356A

STORM WATER POLLUTION PREVENTION MEASURES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4439	(1997) Standard Terminology for Geosynthetics
ASTM D 4491	(1996) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996)) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(1995) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01354 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01331 SUBMITTAL PROCEDURES:

SD-07 Certificates

Mill Certificate or Affidavit; FIO

Certificate attesting that the Contractor has met all specified requirements.

1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described below.

1.4.1 Stabilization Practices

The stabilization practices to be implemented shall include temporary seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, erosion control matts, protection of trees, preservation of mature vegetation, etc. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

1.4.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

1.4.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased.

1.4.2 Structural Practices

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices.

1.4.2.1 Silt Fences

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the drawings. Final removal of silt fence barriers shall be upon approval by the Contracting Officer.]

1.4.2.2 Straw Bales

The Contractor shall provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. Bales shall be properly placed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and

grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, bales shall be placed as work progresses, bales shall be removed/replaced/relocated as needed for work to progress in the drainage area). Areas where straw bales are to be used are shown on the drawings. Final removal of straw bale barriers shall be upon approval by the Contracting Officer. Rows of bales of straw shall be provided as follows:

- a. Along the downhill perimeter edge of all areas disturbed.
- b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
- c. Along the toe of all cut slopes and fill slopes of the construction areas.
- d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced a maximum of 40 meters apart.
- e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced a maximum of 40 m apart.
- f. At the entrance to culverts that receive runoff from disturbed areas.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of -18 to 49 degrees C. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile Elongation (%)	ASTM D 4632	445 N min. 30 % max.
Trapezoid Tear	ASTM D 4533	245 N min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 50 mm by 50 mm when oak is used and 100 mm by 100 mm when pine is used, and shall have a minimum length of 1.5 m. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum mass of 1.98 kg per linear meter and a minimum length of 1.5 m.

2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. The bales shall have a standard cross section of 350 mm by 450 mm. All bales shall be either wire-bound or string-tied. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 50 mm by 50 mm in cross section and shall have a minimum length of 1 m. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum mass of 1.98 kg per linear meter and a minimum length of 1 m .

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 400 mm above the ground surface and shall not exceed 860 mm above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 150 mm overlap, and securely sealed. A trench shall be excavated approximately 100 mm wide and 100 mm deep on the upslope side of the location of the silt fence. The 100 mm by 100 mm trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

3.2 INSTALLATION OF STRAW BALES

Straw bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. The barrier shall be entrenched and

backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 100 mm. After the bales are staked and chinked (gaps filled by wedging with straw), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 100 mm against the uphill side of the barrier. Loose straw shall be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 450 mm deep into the ground to securely anchor the bales.

3.3 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02935 TURF.

3.3.2 Straw Bale Maintenance

Straw bale barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Bale rows used to retain sediment shall be turned uphill at each end of each row. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02935 TURF.

3.4 INSPECTIONS

3.4.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any

storm that produces 13 mm or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.

3.4.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

-- End of Section --

SECTION 01415

METRIC MEASUREMENTS

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 380	(1993) Practice for Use of the International System of Units (SI)
ASTM E 621	(1994; R 1999el) Practice for Use of Metric (SI) Units in Building Design and Construction

1.2 GENERAL

This project includes metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. A number of circumstances require that both metric SI units and English inch-pound (I-P) units be included in a section of the specifications. When both metric and I-P measurements are included, the section may contain measurements for products that are manufactured to I-P dimensions and then expressed in mathematically converted metric value (soft metric) or, it may contain measurements for products that are manufactured to an industry recognized rounded metric (hard metric) dimensions but are allowed to be substituted by I-P products to comply with the law. Dual measurements are also included to indicate industry and/or Government standards, test values or other controlling factors, such as the code requirements where I-P values are needed for clarity or to trace back to the referenced standards, test values or codes.

1.3 USE OF MEASUREMENTS

Measurements shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. When only SI or I-P measurements are specified for a product, the product shall be procured in the specified units (SI or I-P) unless otherwise authorized by the Contracting Officer. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

1.3.1 Hard Metric

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value. Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor. Products are considered to be hard metric when they are manufactured to metric dimensions or have an industry recognized metric

designation.

1.3.2 Soft Metric

- a. A soft metric measurement is indicated by an SI value which is a mathematical conversion of the I-P value shown in parentheses (e.g. 38.1 mm (1-1/2 inches)). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.
- b. A soft metric measurement is also indicated for products that are manufactured in industry designated metric dimensions but are required by law to allow substitute I-P products. These measurements are indicated by a manufacturing hard metric product dimension followed by the substitute I-P equivalent value in parentheses (e.g., 190 x 190 x 390 mm (7-5/8 x 7-5/8 x 15-5/8 inches)).

1.3.3 Neutral

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g., American Wire Gage (AWG) which indicates thickness but in itself is neither SI nor I-P).

1.4 COORDINATION

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

1.5 RELATIONSHIP TO SUBMITTALS

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM E 380 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals.

-- End of Section --

SECTION 01451

CONTRACTOR QUALITY CONTROL 07/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740 (1 994a) Minimum Requirements for Agencies Engaged

in the Testing and/or Inspection of Soil and Rock as

Used in Engineering Design and Construction

ASTM E 329 (1995b) Agencies Engaged in the Testing and/or

Inspection of Materials Used in Construction

1.2 PAYMENT

No separate payment will be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an

interim plan for the first 60 days of operation. Design and Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Design Quality Control (DQC) Plan

The Contractor's DQC Plan shall provide and maintain an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents shall be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product shall not perform the independent technical review (ITR). In addition, the DQC Plan shall incorporate the Lessons Learned Databases provided by the Government. The Contractor shall correct errors and deficiencies in the design documents prior to submitting them to the Government.

The Contractor shall include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major tasks including those that control the flow of work. The schedule shall include review and correction periods associated with each item. This should be a forward planning as well as project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised schedule reflecting the change within seven calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation. Example checklists can be found in ER 1110-1-12.

The DQC Plan shall be implemented by an assigned person with the Contractor's organization who has the responsibility of being present during the times work is in progress, and shall be cognizant of and assure that all documents on the project have been coordinated. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

The Contracting Officer will notify the Contractor, in writing, of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

3.2.3 Content of the CQC Plan

The CQC plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, designers of record, consultants, architect/engineer's (A/E's), fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.

- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, designers of record, consultants, A/E's, off-site fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01331 SUBMITTAL PROCEDURES FOR DESIGN.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (The Contracting Officer must approve Laboratory facilities.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
 - g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been connected.
- h. Reporting procedures, including proposed reporting formats. The Contractor shall utilize a Government-furnished software program titled "RMS" (Resident Management System). See paragraph, IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM FOR CONTRACTOR QUALITY CONTROL OF CONTRACT, of this section for additional details.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.
- j. A list of tests to be performed shall be furnished as a part of the CQC Plan. The list shall give the test name, frequency, specification paragraph containing the test requirement, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.
- k. RMS will assist in tracking and reporting for the above requirements. Sample forms generated from the software package shall be used as part of the CQC Plan.

3.2.4 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of design and/or construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction phases. The Government reserves the right to require the Contractor to make changes in

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his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.5 Notification of Changes

After acceptance of the CQC plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Pre-design Conference, before start of design and/or construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager, Designer of Record and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization, which shall be at the site at all times during progress of the work and which shall have complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the on site work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during design and construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC Manager.

3.4.3 Additional Requirement

In addition to the above experience and education requirements, the CQC System Manager shall have completed the course entitled, "Construction Quality Management for Contractors". The Resident Engineer can arrange for this training.

3.4.4 Organizational Changes

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement. Upon acceptance of any changes, the Contractor shall revise the CQC plan to accurately reflect the changes. The CQC plan shall be kept current at all times during the life of the contract.

3.5 SUBMITTALS

Submittals shall be made as specified in Section 0 1330 - SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM FOR CONTRACTOR QUALITY CONTROL OF CONTRACT

The Contractor shall utilize a Government-furnished software program entitled "RMS" (Resident Management System) to maintain critical information needed to manage the project. RMS produces up-to-date management and analysis reports as well as a majority of the forms required in this contract for submission to the Government. One such form is the Daily CQC Reporting System form, which is required to be utilized by the Contractor. This form may be in addition to other Contractor desired reporting forms. However, all other such reporting forms shall be consolidated into this one Government specified Daily CQC Report Form.

The Contractor will also be required to complete RMS Program Module elements which includes, but is not limited to, Prime Contractor staffing; letter codes; planned cumulative progress earnings; subcontractor information showing trade, name, address, point-of-contact, and insurance expiration dates; definable features of work; pay activity and activity information; required Quality Control tests tied to individual activities; planned User Schooling tied to specific specification paragraphs and contractor activities; Installed Property Listing, Transfer Property Listing and submittal information relating to specification section, description, activity number, review period and expected procurement period. The sum of all activity values shall equal the contract amount, and all Bid Items, Options and Additives shall be separately identified, in accordance with the "Bidding Schedule". Bid Items may include multiple Activities, but Activities may only be assigned to one such Bid Item. This Module shall be completed to the satisfaction of the Contracting Officer prior to any contract payment (except for Bonds, Insurance and/or Mobilization, as approved by the Contracting Officer) and shall be updated as required.

- (1) During the course of the contract, the Contractor will receive various Quality Assurance comments from the Government that will reflect corrections needed to Contractor activities or reflect outstanding or future items needing the attention of the Contractor. The Contractor will acknowledge receipt of these comments by specific number reference on his Daily CQC Report, and will also reflect on his Daily CQC Report when these items are specifically completed or corrected to permit Government verification.
- (2) The Contractor's schedule system shall include, as specific and separate activities, all Preparatory Phase Meetings (inspections); all O&M Manuals; and all Test Plans of Electrical and Mechanical Equipment or Systems that require validation testing or instructions to Government representatives.

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The following minimum hardware and software requirements are needed by the Contractor to run RMS: A personal computer with Pentium 11 processor (or higher) and four megabytes (MB) or more of random access memory (RAM), and a 3-1/2 inch high density floppy drive. Also needed is a HP LaserJet Series III printer or later (or compatible), a color monitor, MS-DOS, version 5.0 or later, Word Perfect, version 5.1 or later, and Computer files = 81.

Once the Contract is awarded, the Contractor will be given a copy of the RMS program for implementation. A meeting between the Government and the Contractor will be arranged to inform the Contractor on the use of the software package which is similar to the one the Government will use to manage the project. File updates will be transferred to the Government by disk on a weekly basis, unless electronic transfers are agreed on.

3.7 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the design and construction, to include that of the designer of record, consultants, subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable features of work as follows:

3.7.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications.
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
 - d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
 - g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
 - j. Discussion of the initial control phase.
- k. The Government shall be notified at least 72 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended

by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.7.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
 - d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work on site, or any time acceptable specified quality standards are not being met.

3.7.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.7.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.8 TESTS

3.8.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. If Approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests perfonned by an offsite or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract. The Contractor shall maintain a test log of all tests performed, by type, date, and specification section.

3.8.2 Testing Laboratories

3.8.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.8.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$ 1,000.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.8.3 On Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.8.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Laboratory, f.o.b., at the following address:

For delivery by mail and for other deliveries:

Commander, U.S. Army Engineer Waterways Experiment Station ATTN: CEWES-SC 3909 Halls Ferry Road Vicksburg, Mississippi 39180-6199

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.9 COMPLETION INSPECTION

3.9.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct

an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.9.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or an particular increment thereof if the project is divided into increments by separate completion dates.

3.9.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the

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contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9.4 Post Completion Feedback Meeting and Preparation of Written Minutes

At the completion of this project, the CQC Systems Manager will host a meeting to review the project and to discuss lessons learned during the construction of the project. This meeting should be scheduled for 4 hours on-site and should be attended by the Project Manager and representatives of the major subcontractors, including mechanical and electrical. The Contracting Officer will invite members of the design team to participate

in this meeting.

3.10 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
 - d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
 - f. Submittals reviewed, with contract reference, by whom, and action taken.
 - g. Offsite surveillance activities, including actions taken.
 - h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
 - i. Instructions given/received and conflicts in plans and/or specifications.
 - j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be ftimished to the Government daily within 12 hours after the date covered by the report, except that reports need not be submitted for days on which no work is

performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10.1 Correspondence

The Contractor shall establish and implement a serialized numbering system for letters sent to the Government. The numbering system shall identify the contract number and shall progress sequentially starting with the number one (1) and continuing thereafter without break in numbering. All letters sent to the Government shall include a subject heading which identifies the Contract Clause Number, Special Clause Number, or Technical Provision Number, and the particular subject item addressed by the letter.

3.11 SAMPLE FORMS

Sample forms are enclosed at the end of this section as follows:

- a. Minimum Daily Construction Quality Control Report and the required preparatory and initial inspection documentation.
- b. All tests of piping systems or portions thereof shall be recorded on the "Piping System Test Report".
- C. Roofing operations, including materials used, shall be reported on "CONTRACTOR'S INSPECTOR ROOFING CHECK LIST AND TEST REPORT".
- d. When operation and maintenance instructions for equipment are given to Government representatives by the Contractor, his representative shall record on a form similar to that attached hereto, the applicable data, including the name, organization and signature of each person attending the instructions. All tests on engine-generator sets shall be recorded on "Appendix A" and "Appendix B" forms.
- e. Paint service records documented on ENG Form 144, "Paint Service Record", a copy of which is attached hereto, shall be maintained by the Contractor for each pint formulation used on metal structures (maintenance or new work, other than minor trim items,), and for each paint formulation applied by the manufacturer on prefinished metal products. Paint service records shall be furnished to the Contracting Officer on a weekly basis.

3.12 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

* * * * *

SECTION 01500A

TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

The items furnished under this section shall be maintained in good condition throughout the construction period. The items furnished shall remain the property of the Contractor and shall be removed from the site upon completion of the work.

1.1.1 Site Plan

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired. The site plan shall include drawings and details of all temporary utilities work.

1.1.2 Identification of Employees

See Section: 01100 paragraph 1.3.

1.1.3 Employee Parking

Contractor employees shall park privately owned vehicles in the area shown on the drawings. This area will be within reasonable walking distance of the construction site. Contractor employee parking shall not interfere with existing and established parking requirements of the military installation.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Payment for Utility Services

The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at the resale rate. The Contractor shall carefully conserve any utilities furnished without charge.

1.2.2 Meters and Temporary Connections

The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall provide and maintain necessary temporary connections, distribution lines, meter bases, and meters required to measure the amount of each utility used for the purpose of determining charges. The Contractor shall make arrangements with the post utilities officer before final electrical connection is desired so that a utilities

contract can be established. The Contractor will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation.

1.2.3 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, the Contractor shall notify the Contracting Officer, in writing, 5 working days before termination is desired. The Government will take a final meter reading, and then the Contractor shall disconnect service, and remove the meters. The Contractor shall then remove all the temporary distribution lines, meter bases, and associated paraphernalia. The Contractor shall pay all outstanding utility bills before final acceptance of the work by the Government.

1.2.4 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 915 by 1220 mm in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

1.3.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as shown on the drawings. The signs shall be erected within 15 days after receipt of the notice to proceed. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed from the site.

1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from

the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

1.4.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

1.4.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.5 CONTRACTOR'S TEMPORARY FACILITIES

1.5.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.5.2 Storage Area

The Contractor shall construct a temporary 1.8 m high chain link fence around trailers and materials. The fence shall include plastic strip inserts, colored brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Post spacing shall not exceed the height of the fence unless tubular fence posts and tubular top rails are installed. In this instance post spacing shall not exceed one and one-half times the fence height. Materials shall not be stockpiled outside the fence in preparation for the next day's work.

1.5.3 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but shall be within the military boundaries. Fencing of materials or equipment will not be required at this site; however, the

Contractor shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. The Government will not provide utilities to this area.

1.5.4 Appearance of Trailers

1.5.4.1 Administrative or Material Storage Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers that, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

1.5.4.2 Government Inspector Trailers

Trailers utilized for the Government inspectors office shall present a clean and neat interior and exterior appearance and shall be in a state of good repair at all times during the duration of the project. Trailers that, in the opinion of the Contracting Officer, require exterior painting or interior or exterior maintenance will not be allowed on the military property.

1.5.5 Maintenance of the Construction Area Including the Storage Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly. At no time shall the height of the grass exceed 4-inches. Weeds shall be controlled and shall not exceed grass height.

1.5.6 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

1.6 GOVERNMENT FIELD OFFICE

The Contractor shall furnish a temporary office facility approximately 4 meters by 20 meters with a minimum of 80 square meters of floor space. It shall be located where directed and shall be reserved for Government personnel only. Gravel parking area for a minimum of four vehicles will be provided and reserved for the sole use of the Government. Access from the parking area to the office shall be by elevated walkway or concrete sidewalks. The steps and landings at the doors shall be substantial.

The Contractor shall furnish bottled drinking water, thermostatically controlled space heat, ventilation and air conditioning, electric light (suitable for an office environment), sufficient power, and toilet

facilities consisting of one lavatory, one water closet, and one urinal. The toilet shall be complete with hot and cold running potable water, sewer, and powered bathroom ventilation.

Utilities shall be connected and disconnected by the Contractor in accordance with local codes and to the satisfaction of the Contracting Officer. The facility shall be laid out and furnished as follows:

There shall be two private offices, one at each end furnished with two desks each, two office chairs each, two four drawer legal size file cabinets each, one telephone instrument each. In addition one office will be supplied with a computer and one printer. The center area between the offices shall be a conference area furnished with a conference table and chairs for ten persons, three four drawer legal-size file cabinets a table for the fax machine, a digital plain paper fax machine, a copying machine that is 11 X 17 inch capable, a mobile plan rack, and a moveable plan table large enough to accommodate full scale drawings. The required phone lines shall be extended to both offices (phone and data) and one corner location (phone, data, and fax) in the conference room. Three telephone instruments shall be provided. The two in the offices shall be desk or wall mounted. The instrument in the conference room shall be cordless.

Base Unit: Dell OptiPlex GX240, Pentium 4, 1.7 GHz, 256K Cache,

The minimum configuration for the computer is:

Small Gray Minitower Base (220-5727) Memory: 512 MB, NonECC, PC133 SDRAM, 2X256, GX240 (311-1471) Keyboard: Dell Enhanced Quiet Key PS/2 Rubberdome "3 Hot key" keyboard, Gray OptiPlex (310-0762) Monitor: Dell P992, AG Trinitron, 17.9 Inch Viewable Image Size, OptiPlex, Gray (320-1729) Video Card: 32MB, ATI, Rage Ultra 128, Video Card, (Full Height), GX240 (320-1734) Hard Drive: 40GB EIDE, 7200 RPM, ATA/100 Hard Drive, GX240 (340 - 3585)Floppy Disk Drive: 3.5 Inch, 1.44MB, Floppy Drive OptiPlex (340-2901)Operating System: Windows 2000, SP1, FAT32,CD,English (420-0259) Mouse: Microsoft PS/2 IntelliMouse, 1.3A, OptiPlex, Gray (310-8273) NIC: Integrated 10/100 #Com Remote Wake-up NIC, OptiPlex (430-4061) Modem: Dell V.90 PCI Data/Fax Controllerless Modem for Windows CD-ROM: 48X CD-ROM, EIDE, Small MiniTower, OptiPlex GX240 (313 - 0845)Sound Card: Integrated Sound Blaster Compatible AC97 Sound, OptiPlex (313-8170) Speakers: Harmon/Kardon 19.5 Speakers, OptiPlex Gray (313-1490) Documentation Diskette: OptiPlex Resource CD (313-7168) Additional Storage Products: 16X Max CD-Rewriteable, 2nd Drive, GX150/240 Small Minitower (313-6005) Additional Software: Microsoft Office XP Professional, Norton Utilities Professional 2002 version, Norton Antivirus 2002 version Service: Type 3 Contract - Next Business Day Parts & Labor On-Site Response Initial Year (900-1020) Service: Type 3 Contract - Next Business Day Parts & Labor On-Site Response 2 YR Extended (900-1732)

Or approved equal.

The minimum printer configuration is: Hewlett Packard 1200se or approved equal.

Used furniture and equipment (except computer and printer), in good condition, will be acceptable subject to approval of the Contracting Officer. Computer and printer shall be new.

The main entrance shall be into the conference room. The second egress shall be a door in either of the offices. Entrance and egress doors shall be equipped with substantial locks.

The Contractor shall provide janitorial service and janitorial consumables, fuel for the heating facilities, electricity, telephone, unlimited internet access, copier, fax and printer consumables including but not limited to toner cartridges and paper, hot and cold running domestic water, and bottled water all at no cost to the Government. The Contractor will not be liable for Government placed long distance telephone calls.

The entire facility including the furniture and equipment will remain the property of the Contractor and shall be removed from the site at the completion of the work.

1.6.1 Trailer-Type Mobile Office

The Contractor may, at its option, furnish and maintain a trailer-type mobile office acceptable to the Contracting Officer and providing as a minimum the facilities specified above. The trailer shall be securely anchored to the ground at all four corners to guard against movement during high winds in accordance with the regulations of the State of Kansas for mobile homes.

1.7 PLANT COMMUNICATION

The Contractor shall furnish three phone lines (telephone, fax, and data) to the Corps of Engineers Site Office. The telephone line shall be "full service" including long distance capabilities. The fax line shall be "full service" including long distance capabilities. The data line shall be data quality and capable of data transmission in excess of 50K. Unlimited internet access shall be provided on the data lines in all three locations within the site office.

1.8 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. The safety fence shall be Chain Link (1.8 meters high) around the building site. Orange safety fence may be used in the areas of the parking lots and for utilities. The fence shall be high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 1.5 m high, supported and tightly secured to steel posts located on maximum 3 m centers, constructed at the approved location. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

1.9 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud that is tracked onto paved or surfaced roadways shall be cleaned away as soon as it is deposited. Materials resulting from demolition activities that are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored, elevated from the ground contact on cribbing, and protected from the weather.

1.10 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

- PART 2 PRODUCTS (Not Applicable)
- PART 3 EXECUTION (Not Applicable)
 - -- End of Section --

SECTION 01670A

RECYCLED / RECOVERED MATERIALS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247

Comprehensive Procurement Guideline for Products Containing Recovered Material

1.2 OBJECTIVES

Government procurement policy is to acquire, in a cost effective manner, items containing the highest percentage of recycled and recovered materials practicable consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. The Environmental Protection Agency (EPA) has designated certain items which must contain a specified percent range of recovered or recycled materials. EPA designated products specified in this contract comply with the stated policy and with the EPA guidelines. The Contractor shall make all reasonable efforts to use recycled and recovered materials in providing the EPA designated products and in otherwise utilizing recycled and recovered materials in the execution of the work.

1.3 EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

Various sections of the specifications contain requirements for materials that have been designated by EPA as being products which are or can be made with recovered or recycled materials. These items, when incorporated into the work under this contract, shall contain at least the specified percentage of recycled or recovered materials unless adequate justification (non-availability) for non-use is provided. When a designated item is specified as an option to a non-designated item, the designated item requirements apply only if the designated item is used in the work.

1.4 EPA PROPOSED ITEMS INCORPORATED IN THE WORK

Products other than those designated by EPA are still being researched and are being considered for future Comprehensive Procurement Guideline (CPG) designation. It is recommended that these items, when incorporated in the work under this contract, contain the highest practicable percentage of recycled or recovered materials, provided specified requirements are also met.

1.5 EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be used by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. It is recommended that these non-construction products, when used in the conduct of the work, contain the highest practicable percentage of recycled or recovered materials and that these products be recycled when no longer needed.

-- End of Section --

SECTION 01780

CLOSEOUT SUBMITTALS

Includes Special Change (Submittal Paragraph)(June 2000)

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01332 SUBMITTAL PROCEDURES FOR CONSTRUCTION:

SD-18 Records

As-Built Drawings; GA-RE.

Drawings showing final as-built conditions of the project. The final CADD as-built drawings shall consist of one set of electronic CADD drawing files in the specified format, one set of mylar drawings, 2 sets of blue-line prints of the mylars, and two sets of the approved working as-built drawings.

Record Drawings; GA-RE.

Drawings showing the final project as constructed. The final CADD record drawings shall consist of one set of electronic CADD drawing files in the specified format, one set of mylar drawings, and two (2) sets of blue-line prints of the mylars.

As-Built Record of Equipment and Materials; GA-RE.

Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.

Warranty Management Plan; GA-RE.

Three sets of the warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. The Contractor shall furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

Warranty Tags; GA-RE.

Two record copies of the warranty tags showing the layout and design.

Final Clean-Up; GA-RE.

Two copies of the listing of completed final clean-up items.

1.2 PROJECT RECORD DOCUMENTS

1.2.1 As-Built Drawings

This paragraph covers as-built drawings and record drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings that have been revised to be used for final as-built drawings. Record drawings refer to as-built drawings that have been revised to show only the completed project with all changes, features, systems, and modifications incorporated.

1.2.1.1 Government Furnished Materials

One set of CADD files in the specified software and format revised to reflect all bid amendments will provided by the Government at the pre-construction conference. These files are for no other purpose than the formulation of the as-built and record drawings. The as-bid documents will govern in all instances of difference between the CADD files furnished and the as-bid documents.

1.2.1.2 Monthly As-Built Review Meeting

A monthly as-built review meeting will be conducted during the construction project. Each member of the construction team will attend the meeting and provide information or documentation as required. The meeting will conducted in a mutually agreed upon location. To minimize difficulty in coordinating schedules, efforts will be made for a standing meeting in the same location, at the same time, and on the same day of the week each month.

- a. The Government will chair the meeting and serve as the information conduit.
- b. The Government will provide an agenda for the meeting.
- c. The Contractor shall bring two updated CD's to the meeting.d. The Contractor shall bring the current redline drawings to the meeting.
- e. The Contractor shall display updated CADD as-built files on screen demonstrating that the CADD files match feature on the redline drawings and make changes if necessary.
- f. The Contractor shall leave one CD with the Government. The Contractor shall have updated this copy to include any changes made during the meeting.
- g. The Contractor shall insure that 1) all design/construction and environment drawings are in the Bentley Microstation DGN file format compatible with Ft. Riley's CADD system, and follow Release 1.8 of the Tri-Service CADD standard, 2) an electronic copy of the above standard is furnished, and 3) all submittals are delivered on CD-ROM.
- h. For feature exterior to primary facilities, the Government will ensure the design file, working units and Cartesian coordinates allow for graphics to be geographically located in the Universal Travers Macerator (UTM) zone 15 datum.

1.2.1.3 Exterior Utility Systems

At intervals of 30 days form the time work is begun on new utility systems or on revising existing systems, as-built CADD files shall be submitted showing the condition of the new and altered utility systems. The as-built exterior utility drawings shall show locations and elevations of all underground new and existing utilities encountered, including dimensions from permanent structures and/or survey locations.

1.2.1.4 Working As-Built and Final As-Built Drawings

The Contractor shall revise three (3) sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a weekly basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. Final as-built drawings shall be prepared after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final as-built drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following information:

- a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.
- b. The location and dimensions of any changes within the building structure.
- c. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
- d. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
- e. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
 - f. Changes or modifications which result from the final inspection.
- g. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built prints.
- h. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, the Contractor shall furnish a contour map of the final borrow pit/spoil area elevations.

- i. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.
- j. Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures.
 - (1) Directions in the modification for posting descriptive changes shall be followed.
 - (2) A Modification Circle shall be placed at the location of each deletion.
 - (3) For new details or sections which are added to a drawing, a Modification Circle shall be placed by the detail or section title.
 - (4) For minor changes, a Modification Circle shall be placed by the area changed on the drawing (each location).
 - (5) For major changes to a drawing, a Modification Circle shall be placed by the title of the affected plan, section, or detail at each location.
 - (6) For changes to schedules or drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.
 - (7) The Modification Circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

1.2.1.5 Record Drawings

The Contractor shall revise a copy of the final as-built drawings to reflect only the project as constructed. The Contract Drawing files shall be renamed in a manner related to the contract number i.e., 98-C-10.DGN. Marked-up changes shall be made only to those renamed files. All changes shall be made on the layer/level as the original item. Deleted existing lines (those struck over in red on the as-builts) shall be removed. Additions (shown as green on the as-builts) shall be black with line weights the consistent with the original drawing. The special notes (in blue on layer #63) shall be edited to content appropriate to a new set of drawings. The following additional clarification of the necessary revisions to create record drawings is provided along with the sketch at the end of this section:

KEYED INSTRUCTIONS FOR NOTING REVISIONS

- A. The world "REVISED FOR AS-BUILT CONDITIONS" shall be placed on the first line of the revisions block on all sheets.
- B. Delete all previous triangles, listing of amendments, modification circles, etc. on all drawings.
- ${\tt C.}$ Delete all previous change clouds and revision triangles on all sheets.
- D. The words "RECORD DRAWINGS" shall be placed in the area of the lower right corner of all drawings.

GENERAL INSTRUCTIONS FOR NOTING REVISIONS

- A. Delete all previous change text symbols that were incorporated during the building stage.
- B. The completed record drawings shall be clean drawings showing only the "finished" project as constructed with all changes incorporated.
- C. The date in the revisions block shall be the month and year of the acceptance of the completed project.

1.2.1.6 Drawing Preparation

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

1.2.1.7 Computer Aided Design and Drafting (CADD) Drawings

Only personnel proficient in the preparation of CADD drawings shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols shall be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD files. The electronic files will be supplied on compact disk, read-only memory (CD-ROM). The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built and record drawings. The Contracting Officer will review final as-built and record drawings for accuracy and the Contractor shall make required corrections, changes, additions, and deletions.

- a. CADD colors shall be the "base" colors of red, green, and blue. Color code for changes shall be as follows:
 - (1) Deletions (red) Deleted graphic items (lines) shall be colored red with red lettering in notes and leaders.
 - (2) Additions (Green) Added items shall be drawn in green with green lettering in notes and leaders.
 - (3) Special (Blue) Items requiring special information, coordination, or special detailing or detailing notes shall be in blue.
- b. The Contract Drawing files shall be renamed in a manner related to the contract number (i.e., 98-C-10.DGN. Marked-up changes shall be made only to those renamed files. All changes shall be made on the layer/level as the original item. There shall be no deletions of existing lines; existing lines shall be over struck in red. Additions shall be in green

with line weights the same as the drawing. Special notes shall be in blue on layer #63.

- c. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 3/16 inch high. All other contract drawings shall be marked either "AS-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. Original contract drawings shall be dated in the revision block.
- d. Within 10 days after Government approval of all of the working as-built drawings for a phase of work, the Contractor shall prepare the final CADD as-built drawings for that phase of the work and submit two sets of blue-lined prints of these drawings for Government review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 10 days the Contractors shall revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government.
- e. Within 20 days of substantial completion of all phases of work, the Contractor shall submit the final as-built drawing package for the entire project. The submittal shall consist of one set of electronic files on compact disk read-only memory (CD-ROM), one set of 24-inch by 36-inch mylars, a sheet index showing sufficient planimetric data to indicate the geographical location of the project, two sets of blue-lined prints, and two sets of the approved red-line as-built drawings. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor.
- f. Concurrent with the submission of the items required in e. the Contractor shall submit for approval the record drawings. The submittal shall consist of one set of electronic files on compact disk read-only memory (CD-ROM), one set of 24-inch by 36-inch mylars, a sheet index showing sufficient planimetric data to indicate the geographical location of the project, and two sets of blue-line prints. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor.
- g. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final as-built drawing files, marked prints as specified, and approved record drawings shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

1.2.1.8 Payment

No separate payment will be made fo as-built drawings required under this contract and all cost accrued in connection with such drawings shall be considered a subsidiary obligation of the Contractor.

1.2.2 As-Built Record of Equipment and Materials

The Contractor shall furnish two (2)copies of preliminary record of equipment and materials used on the project 15 days prior to final

inspection. This preliminary submittal will be reviewed and returned promptly after final inspection with Government comments. Three (3) sets of final record of equipment and materials shall be submitted 10 days after final inspection. The designations shall be keyed to the related area depicted on the contract drawings. The record shall list the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA

Description	Specification	Manufacturer	Composition	Where
	Section	and Catalog,	and Size	Used
		Model, and		
		Serial Number		

1.2.3 Final Approved Shop Drawings

The Contractor shall furnish final approved project shop drawings 30 days after transfer of the completed facility.

1.2.4 Construction Contract Specifications

The Contractor shall furnish final as-built construction contract specifications, including modifications thereto, 30 days after transfer of the completed facility.

1.2.5 Real Property Equipment

The Contractor shall furnish a list of installed equipment furnished under this contract. The list shall include all information usually listed on manufacturer's name plate. The "EQUIPMENT-IN-PLACE LIST" shall include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. A draft list shall be furnished at time of transfer. The final list shall be furnished 30 days after transfer of the completed facility.

1.3 WARRANTY MANAGEMENT

1.3.1 Warranty Management Plan

The Contractor shall develop a warranty management plan containg all pertinent information relevant to the clause "Warranty of Construction." At least 30 days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month

and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

- a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.
- b. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.
- c. A list for each warranted equipment, item, feature of construction or system indicating:
 - 1. Name of item.
 - 2. Model and serial numbers.
 - 3. Location where installed.
 - 4. Name and phone numbers of manufacturers or suppliers.
 - 5. Names, addresses and telephone numbers of sources of spare parts.
 - 6. Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items having extended warranties shall be indicated with separate warranty expiration dates
 - 7. Cross-reference to warranty certificates as applicable.
 - 8. Starting point and duration of warranty period.
 - 9. Summary of maintenance procedures required to continue the warranty in force.
 - $10.\ \mbox{Cross-reference}$ to specific pertinent Operation and Maintenance manuals.
 - 11. Organization, names and phone numbers of persons to call for warranty service.
 - $12.\ \mbox{Typical}$ response time and repair time expected for various warranted equipment.
- d. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.
- e. Procedure and status of tagging of all equipment covered by extended warranties.
- f. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.3.2 Performance Bond

The Contractor's Performance Bond shall remain effective throughout the construction and warranty period.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

- b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.
- c. Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.3.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor shall furnish the name, telephone number and address of a licensed and bonded company authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, shall be continuously available, and shall be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.3.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframes specified, the Government will perform the work and back charge the construction warranty payment item established.

- a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.
- b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.
- c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.
- d. The "Construction Warranty Service Priority List" is as follows:
 Code 1-Air Conditioning Systems

- (1) Air conditioning leak in part of building, if causing damage.
- (2) Air conditioning system not cooling properly.

Code 1-Doors

- (1) Overhead doors not operational, causing a security, fire, or safety problem.
- (2) Interior, exterior personnel doors or hardware, not functioning properly, causing a security, fire, or safety problem.

Code 3-Doors

- (1) Overhead doors not operational.
- (2) Interior/exterior personnel doors or hardware not functioning properly.

Code 1-Electrical

- (1) Power failure (entire area or any building operational after 1600 hours).
- (2) Security lights
- (3) Smoke detectors

Code 2-Electrical

- (1) Power failure (no power to a room or part of building).
- (2) Receptacle and lights (in a room or part of building).

Code 3-Electrical

Street lights.

Code 1-Gas

- (1) Leaks and breaks.
- (2) No gas to family housing unit or cantonment area.

Code 1-Heat

- (1). Area power failure affecting heat.
- (2). Heater in unit not working.

Code 2-Kitchen Equipment

- (1) Dishwasher not operating properly.
- (2) All other equipment hampering preparation of a meal.

Code 1-Plumbing

- (1) Hot water heater failure.
- (2) Leaking water supply pipes.

Code 2-Plumbing

- (1) Flush valves not operating properly.
- (2) Fixture drain, supply line to commode, or any water pipe leaking.
- (3) Commode leaking at base.

Code 3-Plumbing

Leaky faucets.

Code 3-Interior

- (1) Floors damaged.
- (2) Paint chipping or peeling.
- (3) Casework.

Code 1-Roof Leaks

Temporary repairs will be made where major damage to property is

occurring.

Code 2-Roof Leaks

Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Code 2-Water (Exterior)
No water to facility.

Code 2-Water (Hot)

No hot water in portion of building listed.

Code 3-All other work not listed above unless causing a security, fire, or safety problem.

1.3.5 Warranty Tags

At the time of installation, each warranted item shall be tagged with a durable, oil and water resistant tag approved by the Contracting Officer. Each tag shall be attached with a copper wire and shall be sprayed with a silicone waterproof coating. The date of acceptance and the QC signature shall remain blank until project is accepted for beneficial occupancy. The tag shall show the following information.

a.	Type of product/material
b.	Model number
c.	Serial number
d.	Contract number
e.	Warranty periodtoto
f.	Inspector's signature
g.	Construction Contractor
	Address
	Telephone number
h.	Warranty contact
	Address
	Telephone number
i.	Warranty response time priority code

- j. WARNING PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.
- 1.4 MECHANICAL TESTING, ADJUSTING, BALANCING, AND COMMISSIONING

Prior to final inspection and transfer of the completed facility; all reports, statements, certificates, and completed checklists for testing, adjusting, balancing, and commissioning of mechanical systems shall be submitted to and approved by the Contracting Officer as specified in

applicable technical specification sections.

1.5 OPERATION AND MAINTENANCE MANUALS

Operation manuals and maintenance manuals shall be submitted as specified. Operation manuals and maintenance manuals provided in a common volume shall be clearly differentiated and shall be separately indexed.

1.6 FINAL CLEANING

The Contractor shall leave the facility in a clean "ready-to-be-lived-in" condition upon completion of the required work. The Contractor shall meet the cleanliness standards specified herein.

1.6.1 Cleaning Materials

Use cleaning materials which will not create hazards to health, property or environment, and which will not damage surfaces to be cleaned.

1.6.2 Cleaning Equipment

Use cleaning equipment designed for the specific tasks to be performed. Electrically powered cleaning equipment shall be free from safety defects.

1.6.3 Cleanliness

Upon completion of the required work, the Contractor shall ensure the following items are accomplished:

1.6.3.1 Floors

Floors, including stairs and landings, shall be clean and free of dust, marks and scuffs. Resilient tile floors shall be cleaned, burnished, and waxed in accordance with the tile manufacturer's recommendations, damp mopped and free of streaks. Carpet shall be vacuumed and free of dirt, stains, paint and debris.

1.6.3.2 Walls

Walls, woodwork and closet shelving shall be clean and free of dust.

1.6.3.3 Cabinets

Cabinets shall be empty, clean and free of dust, and the doors left closed.

1.6.3.4 Doors and Windows

Doors and windows shall be clean, free of dust, closed and locked.

1.6.3.5 Light Fixtures

Light fixtures, exhaust fans, range hoods, and all grilles and registers shall be clean and free of dust and debris.

1.6.3.6 Toilets, Tubs, Showers and Sinks

Toilets, tubs and sinks shall be cleaned thoroughly to a sanitary condition and be free of dirt, cleaning residue and stains. Shower walls, doors, rods curtains, and appurtenances must be clean and free of streaks and cleaning

residue.

1.6.3.7 Patios, Garages, Porches and Exposed Concrete

Patios, garages, porches, and concrete drives and fire lanes must be cleaned and free of debris, dirt and stains. During the winter, they must be free of snow and ice as well.

1.6.3.8 Appliances

Appliances must be clean and free of dust, stain and adhesive left from labels.

1.6.3.9 Mechanical System Filters

Filters must be clean and free of dust and stains. Filters utilized during the construction must be replaced unless cleanable (non-paper) filters are supplied. These filters must be cleaned in accordance with the manufacturer's recommendations.

1.6.3.10 Debris

Debris shall be removed from roofs, drainage systems, gutters, and downspouts.

1.6.3.11 Paved Areas

Paved areas shall be swept.

1.6.3.12 Landscaped and Grassed Areas

Landscaped and grassed areas shall be raked clean, mowed, and free of weeds and debris.

1.6.3.13 Site

The entire site shall have waste, surplus materails, and rubbish removed.

1.6.3.14 Project Area

The project area shall have temporary structures, barricades, project signs, and construction facilities removed.

1.6.4 Completed Clean-up Items

A list of completed clean-up items shall be submitted on the day of final inspection.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

DIVISION 2 – SITE WORK

02000: Outline Specifications

Government-Edited Guide Specifications:

02555 Prefabricated Underground Heating/Cooling Distribution System
02556 Gas Distribution System
02791 Playground Protective Surfacing
02882 Playground Equipment

SECTION 02000

DIVISION 02: SITE WORK - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENT

Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 02: SITE WORK:

Section 02220, DEMOLITION

Section 02230, CLEARING AND GRUBBING

Section 02300, EARTHWORK

Section 02315, EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS

Section 02316, EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES

Section 02510, WATER DISTRIBUTION SYSTEM

Section 02555A, PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM

Section 02556A, GAS DISTRIBUTION SYSTEM

Section 02620A, SUBDRAINAGE SYSTEM

Section 02630, STORM DRAINAGE SYSTEM

Section 02663, PAVEMENT MARKINGS

Section 02821, FENCING

Section 02921A, SEEDING

Section 02922A, SODDING

Section 02930, EXTERIOR PLANTING

Section 02935, EXTERIOR PLANT MAINTENANCE

1.1.1 Kansas Department of Transportation Specifications

The Contractor shall use The Kansas Department of Transportation, "STANDARD SPECIFICATIONS FOR STATE ROAD AND BRIDGE CONSTRUCTION" for the specification items listed in paragraph 1.3 below.

1.1.2 Government Edited Specifications

The contractor shall incorporate the following government-supplied, fully edited specification sections as part of the project design:

Section 02791, PLAYGROUND PROTECTIVE SURFACING

Section 02882, PLAYGROUND EQUIPMENT

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 977	(1991) Emulsified Asphalt
ASTM D 2027	(1976; R 1992) Cutback Asphalt (Medium-Curing Type)
ASTM D 2028	(1976; R 1992) Cutback Asphalt (Rapid-Curing Type)
ASTM D 2397	(1994) Cationic Emulsified Asphalt

1.2 Kansas Department of Transportation, "STANDARD SPECIFICATIONS FOR STATE ROAD AND BRIDGE CONSTRUCTION".

Measurement and Payment paragraphs in KDOT specifications shall not apply.

1.2.1 Material and Performance Criteria

A. Excavation for roads, parking lots, and other surfaced areas shall conform to state specification section 204.

Testing:

In-place field density testing and frequency of testing shall conform to state specifications. Field density tests are to be taken at a frequency not less than one test every 1,000 square meters per lift of embankment or subgrade. Laboratory density and moisture testing will be performed at a rate of one test per 500 cubic meters of material placed or when there is a change of material. During construction of embankments or fills, the working surface will be sloped to prevent the ponding of water. After completion, newly graded areas will be protected from traffic and erosion.

- B. Embankments and fills: Embankments and fills shall be constructed and tested in accordance with the Kansas State Department of Transportation "STANDARD SPECIFICATIONS FOR STATE ROAD AND BRIDGE CONSTRUCTION", referred to herein as state specification. The latest edition and revisions of the state specification shall be used for all work.
- C. Pre-construction testing requirements: All mix designs, and materials proposed for use in the work shall be tested initially for conformance to state specification requirements prior to delivering the materials to the project site. Certified copies of laboratory test reports shall verify that mix designs conform to state specification and the requirements specified herein. Certified copies of laboratory test reports shall verify that aggregate gradations, composition, and quality requirements, and other materials proposed for use in the work conform to state specification. A certified copy of each mix design and materials test reports, shall be submitted to: U.S. Army Corps of Engineers, CENWK-EC-GL for review. The above mix design and materials

test report submittals shall be submitted during the project design. The mix design, and materials test report submittals, shall include names of companies and contractor's performing the mix design and testing, with a listing of all sources of materials and aggregates proposed for use in the work. The listing shall include a point of contact and telephone number for each material type and source.

- D. Construction testing: Portland cement concrete, asphalt concrete mixtures shall be tested during construction in accordance with state specification, and certified laboratory reports shall be submitted to the Contracting Officer within 24 hours following completion of the test. In place density, compacted thickness, and gradation testing for each course shall be accomplished in accordance with the requirements and testing frequency specified in the state specification. Where the state specification testing frequency for subgrade, aggregate courses, and surface courses is not defined or is greater than 1,000 square meters, a minimum testing requirement of 1,000 square meters for each course or lift shall be used. All testing required on each course or lift shall be accomplished prior to commencing construction of the next course or lift. A certified copy of each test report for all testing, shall be submitted to the contracting officer within 24 hours following completion of the test. The materials testing laboratory shall conform to the state requirements for testing laboratories.
- E. Asphalt concrete shall conform to state specification section 605, PLANT MIX BITUMINOUS MIXTURE COMMERCIAL GRADE. The grade of asphalt cement shall not be changed without an approved laboratory mix design. It shall also comply with KDOT Special Provisions 90M-197 Latest Revision and 90M-0196 Latest Revision. A certified refinery analysis from the proposed source shall be submitted with the mix design. Aggregates for asphalt concrete (bituminous mixtures) shall conform to state specification section 1103.

In addition the following requirements pertain:

The Total aggregate (coarse aggregate, fine aggregate, and mineral filler passing the 75 um (No. 22 sieve) shall contain not less than 85 percent crushed material. All bituminous mixtures shall contain an anti-stripping agent. AD-here LOF 65-00 LS as manufactured by ARR-MAZ Products, L.P. shall be added to the asphalt cement at the rate of 0,75% by weight of the asphalt cement. Other asphalt anti-stripping additives and their application rate may be used when proven equal after testing in accordance with ASSHTO T 283-89. Asphalt concrete mixtures shall be tested in accordance with ASSHTO T 283, and shall have a retained strength of at least 80 percent. Asphalt cement shall conform to ASSHTO-MPI Performance Graded Asphalt Binder PG 64-22. The asphalt concrete mix design shall conform to Asphalt Institute MS-2, sixth edition, Marshall Mix Design Method, 75 blow criteria. The mix design shall use the materials proposed for use in the work. The mix design shall be accomplished by a commercial testing laboratory conforming to the requirements of ASTM D 3666-96a.

The percentage of loss shall not be greater than 18 percent after five cycles when tested in accordance with ASTM C 88 using magnesium sulfate or 12 percent when using sodium sulfate. At least 75 percent by weight of coarse aggregate shall have at least two or more fractured faces when tested in accordance with COE CRD-C 171. Fractured faces shall be produced by crushing. The particle shape shall be essentially cubical and the aggregate shall not contain more than 20% percent, by weight,

of flat and elongated particles (3:1 ratio of maximum to minimum) when tested in accordance with ASTM D 4791. Fine aggregate shall consist of clean, sound, tough, durable particles. The aggregate particles shall be free from coatings of clay, silt, or any objectionable material and shall contain no clay balls. All individual fine aggregate sources shall have a sand equivalent value not less than 45 when tested in accordance with ASTM D 2419. The fine aggregate portion of the blended aggregate shall have an uncompacted void content not less than 43.0 percent when tested in accordance with ASTM C 1252 Method A. Mineral Filler shall be nonplastic material meeting the requirements of ASTM D 242. The absorption shall be tested in accordance with State Specifications with a maximum limit of 4.0 percent.

Base course aggregates: Base course aggregates used for roads, parking lots, and other surfaced areas shall be crushed aggregate conforming to state specification subsection 1105, Type AB-1.

In addition the following requirements shall pertain:

The portion of the aggregate passing the $0.425 \mathrm{mm}$ sieve shall have a maximum limit on plasticity index of 5 and liquid limit of 25. The percent passing the .075mm sieve shall be between 0 to 10 percent by weight. The coarse aggregate shall not show more than 40 percent loss after 500 revolutions when subjected to the Los Angeles abrasion test in accordance with ASTM C 131. The coarse aggregate shall not exhibit a loss greater than 18 percent weighted average, at five cycles, when tested for soundness in magnesium sulfate in accordance with ASTM C 88. The amount of flat and elongated particles shall not exceed 20 percent for the fraction retained on the 12.5mm sieve nor 20 percent for the fraction passing the $12.5 \, \text{mm}$ sieve. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregate shall contain at least 90 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest mid sectional area of the face. When 2 fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Fine aggregate shall be natural sand or angular particles produced by crushing stone or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The absorption shall be tested in accordance with State Specifications with a maximum limit of 4.0 percent. The Specific Gravity shall be tested in accordance with State Specifications with a minimum limit of 2.20.

The maximum density and optimum moisture content shall be determined in accordance with ASTM D 1557, Method D. Compaction shall continue until each layer has a degree of compaction that is at least 100 percent of laboratory maximum density through the full depth of the layer.

F. Bituminous Prime Coat

Bituminous Prime Coat shall conform to state specification section 612, and the requirements herein. Bituminous prime coat shall be: liquid asphalt conforming to the requirements of ASTM D 2027, designation MC-30 or MC-70, at the Contractor's option, except that only MC-30 shall be used on dense graded base courses if MC-70 does not adequately penetrate the base course material. In lieu of cut-back asphalt, the Contractor may use cationic emulsified asphalt conforming to the

requirements of ASTM D 2397, designation CSS-1 or CSS-1h.

G. Bituminous Tack Coat

Unless otherwise directed or required, bituminous material shall be emulsified asphalt conforming to the requirements of ASTM D 977, designation SS-1 or SS-1h or cationic emulsified asphalt conforming to the requirements of ASTM D 2397, designation CSS-1 or CSS-1h.

H. Portland cement concrete construction: Concrete pavement construction shall conform to UFGS specification section 03300.

Steel Reinforcement for use in pavements shall conform to state specifications, and to the requirements specified in other sections.

- I. Base course aggregates used for roads, parking lots, and other surfaced areas shall be crushed aggregate conforming to state specification subsection 1105, Type AB-1.
- J. Traffic Signage: Signs shall conform to state specification subsection 825.
- 1.3 Section 02555A, PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM

This guide specification covers the requirements for prefabricated underground distribution system for chilled water systems.

1.3.1 Underground Chilled Water Piping

Underground chilled water piping shall extend from the mechanical room to the packaged, air cooled, rotary screw liquid chiller as required in Section 01016, MECHANICAL REQUIREMENTS.

1.3.2 Low Temperature Hot Water and Dual Temperature Water

This guide specification also covers the requirements for prefabricated underground distribution system for low temperature hot water systems (less than 95 degrees C) and dual temperature water systems. Delete all requirements for low temperature hot water systems (less than 95 degrees C) and dual temperature water systems from this specification.

1.3.3 Casing Material

Casing material shall be non-metallic and shall be as recomended by the manufacturer of the piping system for use with the carrier pipe. When different materials are provided for the casing material and the carrier pipe, the contractor shall demostrate with manufacture's published data that differential material expansion rates between the casing material and the carrier pipe shall not lead to product failure.

1.4 Section 02556A, GAS DISTRIBUTION SYSTEM

This guide specification covers the requirements for natural or manufactured gas distribution systems designed in accordance with ASME B31.8.

1.4.1 Natural Gas

The facility is to be supplied with natural gas. Delete all references to

liquefied petroleum gas (LPG) or manufactured gas systems from this specification.

1.4.2 Polyethylene Pipe

All underground natural gas piping shall be polyethylene pipe. Delete all references to other material types for underground gas piping from this specification.

1.5 SECTION 02620, SUBDRAINAGE SYSTEM

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. All specification submittals shall be designated "FIO.
- B. Pipe specified shall be perforated plastic pipe.
- C. Drainage aggregate shall conform to KDOT Standard Specification Section
- D. Filter Fabric shall be
- 1.6 SECTION 02630, STORM DRAINAGE

1.7.1 Material and Performance Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. All specification submittals shall be designated "FIO".
- B. Submittals of pipe samples is not required.
- 1.7 SECTION 02831, FENCING

1.7.1 Material and Performance Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. Chainlink fabric shall be either zinc or aluminum coated 9-gage wire woven in a 50 mm mesh. Tie wires shall be 9-gage galvanized steel wire.
- B. All specification submittals shall be designated "FIO".

1.8 SECTION 02921A SEEDING and/or 02922A, SODDING

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

1.8.1 Seeding and Sodding

Seed Mixture Mixture:	% Mixture	Kg per 100 Sq Meter
Turf Type Fescue Festuca arundinacea Bonsai (turf type fescue Finelawn 8855	100	2.5

dwarfvarieties) Shortstop Tomahawk Monarch Mustang Twilight Olympic Houndog Apache

Notes: Any of the seed varieties listed above may be used singularly or in combination.

Total 100% 2.5 kg/100 sq meter

Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected. Seed mixing shall be performed by the seed supplier prior to delivery to the site. Minimum 85% pure live seed. Bulk quantities of seed shall be labeled.

-- End of Section --

SECTION 02555A

PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 105/A 105M	(2001) Carbon Steel Forgings for Piping Applications
ASTM A 106	(1999e1) Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A 183	(1998) Carbon Steel Track Bolts and Nuts
ASTM A 234/A 234M	(2000) Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
ASTM A 53/A 53M	(2001) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 536	(1984; R 1999el) Ductile Iron Castings
ASTM B 62	(1993) Composition Bronze or Ounce Metal Castings
ASTM B 75M	(1999) Seamless Copper Tube (Metric)
ASTM B 88M	(1999) Seamless Copper Water Tube (Metric)
ASTM C 518	(1998) Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C 591	(1994) Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM D 1384	(1997a) Corrosion Test for Engine Coolants in Glassware
ASTM D 1784	(1999a) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 2000	(1999) Rubber Products in Automotive Applications
ASTM D 2241	(2000) Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
ASTM D 2564	(1996a) Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D 3139	(1998) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3350	(2000) Polyethylene Plastics Pipe and Fittings Materials
ASTM D 5686	(1995) "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Pipe Fittings, Adhesive Bonded Joint Type Epoxy Resin, for Cendensate Return Line
ASTM F 477	(1999) Elastomeric Seals (Gaskets) for Joining Plastic Pipe

AMERICAN WATER WORKS ASSOCIATION(AWWA)

AWWA C606 (1997) Grooved and Shouldered Joints

ASME INTERNATIONAL (ASME)

ASME B1.20.1 (1983; R 1992) Pipe Threads, General Purpose (Inch) **ASME B16.11** (1996) Forged Fittings, Socket-Welding and Threaded **ASME B16.18** (1984; R 1994) Cast Copper Alloy Solder Joint Pressure Fittings **ASME B16.22** (1995; B16.22a1998) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings (1988) Cast Copper Alloy Fittings for Flared Copper Tubes **ASME B16.26 ASME B16.9** (1993) Factory-Made Wrought Steel Buttwelding Fittings **ASME B31.1** (1998) Power Piping (1998) Boiler and Pressure Vessel Code; Section IX, Welding and ASME BPVC SEC IX **Brazing Qualifications** COPPER DEVELOPMENT ASSOCIATION (CDA) CDA Tube Handbook (1995) Copper Tube Handbook MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

1.2 SYSTEM DESCRIPTION

The system consists of a buried prefabricated [chilled water] [and] [low temperature hot water] [dual temperature] distribution system including service connections to a point 150 mm inside of the building. The contract drawings show the specific arrangement of piping, sizes and grades of pipe, and other details. The system is designed for an operating pressure of [____] kPa and an operating temperature of [[____] degrees C for hot water] [and] [[____] degrees C for chilled water].

(1991; R 1996) Brazing Joints for Copper and Copper Alloy Pressure

1.3 SUBMITTALS

MSS SP-73

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Distribution	System;	[1.	Γ

Detail drawings consisting of fabrication and assembly drawings, for all parts of the work in sufficient detail to check conformity with the requirements of the contract documents, prior to installation. Detail drawings shall also contain complete piping, wiring and schematic diagrams and any other details to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout, method of compensation for pipe expansion and contraction, anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances required for maintenance and operation. The drawings shall clearly identify any proposed deviations from the requirements of the contract documents.

SD-03 Product Data
Distribution System; [], []
Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with the requirements of the contract documents.
SD-07 Certificates
Distribution System; [], []
The manufacturer's or system fabricator's written certification stating that the distribution system furnished meets all the requirements of this specification.
Welding; [], []
Prior to welding operations, a copy of qualified procedures and a list of names and identification symbols of qualified welders and welding operators.
SD-10 Operation and Maintenance Data
Distribution System; G, []
[Six] [] copies of operation and [6] [] copies of maintenance manuals for the equipment furnished, 1 complete set prior to performance testing and the remainder upon acceptance. Operation manuals shall detail the step-by-step procedures required for equipment startup, operation, and shutdown. Operation manuals shall include the manufacturer's name, model number, parts list, and brief description of all equipment and their basic operating features. Maintenance manuals shall list routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. Maintenance manuals shall include piping and equipment layout and simplified wiring and control

1.4 DELIVERY AND STORAGE

After delivery to the jobsite, all materials and equipment shall be protected from anything which could cause damage to the material or equipment. Pipe shall be sealed at each end to keep the interior clean and free of dirt and debris. Fittings shall be kept together and their interior surfaces shall remain clean. Insulation shall be kept dry and clean.

approved prior to the field performance testing.

diagrams of the equipment system as installed. Manuals shall be

1.5 FIELD MEASUREMENTS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field and shall advise the Contracting Officer of any discrepancy before performing the work.

1.6 WELDING

[Piping shall be welded in accordance with qualified procedures using performance qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME BPVC SEC IX. Welding procedures qualified by others, and welders and welding operators qualified by another employer may be accepted as permitted by ASME B31.1. The Contracting Officer shall be notified 24 hours in advance of tests and the tests shall be performed at the work site if practicable. The welder or welding operator shall apply his assigned symbol near each weld he makes as a permanent record. Structural members shall be welded in accordance with Section 05090A WELDING, STRUCTURAL.] [Welding and nondestructive testing procedures are specified in Section 05093A WELDING PRESSURE PIPING.]

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

System components shall be standard products of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The system shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

2.2 PIPING AND CASING MATERIALS

2.2.1 General

Metallic pressure pipe, fittings, and piping accessories shall conform to the requirements of ASME B31.1 and shall be types suitable for the temperature and pressure of the water.

2.2.2 Piping

2.2.2.1 Steel Pipe

Piping shall conform to ASTM A 53/A 53M, Grade B, standard weight, black or to ASTM A 106, Grade B, standard weight.

2.2.2.2 Copper Tubing

Copper tubing shall conform to ASTM B 88M , Type K or L.

2.2.2.3 Reinforced Thermosetting Resin Pipe (RTRP)

RTRP pipe shall conform to ASTM D 5686.

2.2.2.4 Polyvinyl Chloride (PVC) Pipe

PVC pipe shall conform to ASTM D 2241 with a Standard Thermoplastic Pipe Dimension Ratio (SDR) of 26 and PVC 1120 or 1220 as the material.

2.2.2.5 Joints and Fittings for Copper Tubing

Wrought copper and bronze solder-joint pressure fittings shall conform to ASME B16.22 and ASTM B 75M. Cast copper alloy solder-joint pressure fittings shall conform to ASME B16.18. Cast copper alloy fittings for flared copper tube shall conform to ASME B16.26 and ASTM B 62. Brass or bronze adapters for brazed tubing may be used for connecting tubing to flanges and to threaded ends of valves and equipment. Extracted brazed tee

joints produced with an acceptable tool and installed as recommended by the manufacturer may be used. Grooved mechanical joints and fittings shall be designed for not less than 862 kPa service and shall be the product of the same manufacturer. Grooved fitting and mechanical coupling housing shall be ductile iron conforming to ASTM A 536. Gaskets for use in grooved joints shall be molded synthetic polymer of pressure responsive design and shall conform to ASTM D 2000 for circulating medium up to 110 degrees C . Grooved joints shall conform to AWWA C606. Coupling nuts and bolts for use in grooved joints shall be steel and shall conform to ASTM A 183.

2.2.3 Casings

2.2.3.1 Polyvinyl Chloride (PVC) Casing

PVC casings shall conform to ASTM D 1784, Class 12454-B with a minimum thickness equal to the greater of 1/100 the diameter of the casing or 1.50 mm.

2.2.3.2 Polyethylene (PE) Casing

Polyethylene casings shall conform to ASTM D 3350, Type III, Class C, Category 3 or 4, Grade P 34 with thickness as follows:

Casing Diameter	Minimum Thickness
(in mm)	(in mm)
250 and smaller	3
250 to 450	4
450 to 600	5
over 600	6

2.2.3.3 Reinforced Thermosetting Resin Pipe (RTRP) Casing

RTRP casing shall be of the same material as the pipe, with casing thickness as follows:

Minimum Thickness (in mm)
1.2
2
2.7
2.9
3
3.2
3.9

2.3 PIPING CONNECTIONS

2.3.1 Steel Pipe

Steel pipe smaller than 20 mm (3/4 inch) may be threaded; otherwise, all steel pipe shall be welded. Steel welding fittings shall conform to the requirements of ASTM A 105/A 105M or ASTM A 234/A 234M. Welding fittings shall also conform to ASME B16.9 for buttweld fittings and ASME B16.11 for socket-weld fittings. Long radius buttwelding elbows conforming to ASME B16.9 shall be used whenever space permits. Pipe Threads shall conform to ASME B1.20.1. Pipe to be threaded shall be schedule 80.

2.3.2 Copper Pipe

Copper pipe shall be brazed or connected using an insulated pipe coupling. Wrought copper or cast copper alloy solder joint pressure fittings shall conform to MSS SP-73. Insulated pipe couplings for copper pipe shall be cast bronze containing an O-ring seal on each end and shall be jacketed and sealed to act as an expansion joint.

2.3.3 Plastic Pipe

- a. Pipe, fittings, flanges, and couplings shall have end connections of the adhesive bell and spigot type. Threaded piping, including pipe, fittings, flanges, and couplings, will not be permitted.
- b. Flanged Connections: Flat face flanged connections shall be provided between plastic piping and metal piping. Plastic flanges shall be suitable for connection to ASME Class 150 flanges.
- c. RTRP Piping Sizes: When piping sizes other than 50, 75, 100, 150, and 200 mm (2, 3, 4, 6, and 8 inches) are indicated, the next larger piping size shall be provided. The connecting system piping shall be of the same size or increased to meet the next size of RTRP piping.

2.3.3.1 General

Plastic fittings shall be made of the same type and grade of material as the piping to which they will be connected and shall be furnished by the manufacturer who supplies the pipe. Fittings shall have temperature and pressure ratings not less than those of the connecting piping.

2.3.3.2 Polyvinyl Chloride (PVC)

Polyvinyl chloride (PVC) pipe shall be solvent welded or connected using bell and spigot connections. The solvent used to connect fittings and pipe shall conform to the requirements of ASTM D 2564. Bell and spigot joints utilizing elastomeric seals shall conform to the requirements of ASTM D 3139. The elastomeric seals shall conform to ASTM F 477.

2.3.3.3 Reinforced Thermosetting Resin Plastic (RTRP)

Reinforced thermosetting resin plastic pipe shall be joined using fittings and adhesive furnished by the pipe manufacturer in accordance with ASTM D 5686.

2.4 END SEALS

2.4.1 General

Each preinsulated section of piping shall have a complete sealing of the insulation to provide a permanent water and vapor seal at each end of the preinsulated section of piping. Preinsulated sections of piping modified in the field shall be provided with an end seal which is equivalent to the end seals furnished with the preinsulated section of piping. End seals must be tested and certified in accordance with paragraph Casing and End Seal Testing and Certification.

2.4.2 Types

End seals provided shall be one of the following types:

- a. Carrying the outer casing over tapered pipe insulation ends and extending it to the carrier pipe. Sufficient surface bonding area shall be provided between the casing and the carrier pipe.
- b. Using specially designed molded caps made of polyethylene or rubber of standard manufactured thickness. A minimum 40 mm surface bonding area shall be provided between the cap and both the casing and carrier pipe.
- c. Using elastomer-ring end seals designed and dimensioned to fit in the annular space between the casing and the carrier pipe.
- d. Using a waterproof mastic seal vapor barrier over the exposed insulation ends.
- e. Shrink sleeves.

2.4.3 Casing and End Seal Testing and Certification

Testing and certification procedures by an independent testing laboratory shall demonstrate that casings and end seals are capable of resisting penetration of water into the casing and insulation. The test shall be performed on the type of prefabricated system to be furnished. If more than one type of prefabricated system is to be used, then the tests shall be performed on each type. The test shall consist of hot and cold cycle testing followed by immersion in a water filled chamber with a head pressure. The hot and cold cycle testing shall consist of 14 days of temperature cycling. A fluid with a temperature of 5 degrees C shall circulate through the carrier pipe alternating every 24-hours with a fluid with a temperature of 95 degrees C circulating through the carrier pipe for a low temperature hot water or dual temperature service or 24 degrees for a chilled water service. While the hot and cold cycle test is being performed, the test sample is either buried or encased in dry bedding sand with a minimum of 300 mm of sand all around the test sample. The carrier pipe size of the test sample shall be 80 mm (3 inches) in diameter and shall be restrained during the test period. The insulation thickness shall not exceed the maximum thickness provided for the piping in the project. Transition time for temperature cycle testing shall not exceed 15 minutes in going from cold to hot and 30 minutes in going from hot to cold. The fluid in the carrier pipe may be water, oil or heat transfer fluid. Following the hot and cold cycling test, the test sample shall be immersed in a water filled chamber. The pressure on the highest point of the test sample shall not be less than 60 kPa subjected over the entire length of the 2.4 m test sample of prefabricated pipe. The water shall contain a dye penetrant, which will be used to check for end seal leakage. The pressure in the chamber must be held for not less than 48 hours. completion of this pressure test, the test sample shall be cut open. With the use of a light that will readily show the presence of the dye that was in the water, the test sample shall be inspected. Evidence of the dye inside the test sample shall indicate that the end seal is not acceptable and cannot be certified.

2.5 INSULATION

The Contractor shall comply with EPA requirements in accordance with Section 01670A RECYCLED / RECOVERED MATERIALS.

2.5.1 Factory Applied Insulation

Prefabricated pipe and fittings shall be insulated in the factory. Foam insulation for prefabricated insulated pipe and fittings shall be polyurethane foam meeting the requirements of ASTM C 591 having a density not less than 32 kg per cubic meter. The polyurethane foam shall completely fill the annular space between the carrier pipe and the casing. Insulation thickness shall be a minimum of [20] [____] mm. The insulation thermal conductivity factor shall not exceed the numerical value of 0.02 W/mK (0.15 Btu-inch/square foot-degree F-hour) at 24 degrees C, when tested in accordance with ASTM C 518. Manufacturer shall certify that the insulated pipe is free of insulation voids.

2.5.2 Field Applied Insulation

Field applied insulation for fittings, and field casing closures, if required, and other piping system accessories shall be polyurethane matching the pipe insulation. Thickness shall match adjacent piping insulation thickness. Buried fittings and accessories shall have field applied polyurethane insulation to match adjacent piping and shall be protected with a covering matching the pipe casing. Shrink sleeves with a minimum thickness of 1.3 mm shall be provided over casing connection joints.

2.6 CONCRETE VALVE MANHOLES

Concrete valve manholes shall be provided in accordance with $^{\sf Section\ 02570A}$ VALVE MANHOLES AND PIPING AND EQUIPMENT IN VALVE MANHOLES.

2.7 PIPING AND EQUIPMENT IN VALVE MANHOLES

Piping and equipment in valve manholes shall be provided in accordance with Section 02570A $\,$ VALVE MANHOLES AND PIPING AND EQUIPMENT IN VALVE MANHOLES.

2.8 TREATED WATER

A [____] percent concentration by volume of industrial grade [ethylene] [propylene] glycol shall be provided for the system. Glycol shall be tested in accordance with ASTM D 1384 with less than 0.013 mm penetration per year for all system metals. The glycol shall contain corrosion inhibitors. Silicate based inhibitors shall not be used. The solution shall be compatible with pump seals, other elements of the system, and water treatment chemicals used within the system.

PART 3 EXECUTION

3.1 INSTALLATION

For all preinsulated, prefabricated systems, the Contractor shall obtain the services of a trained representative of the pipe system manufacturer to instruct the Contractor's work forces in the installation procedures to ensure that the system is installed in accordance with the manufacturer's published instructions and the plans and specifications. The manufacturer's representative shall be a person who regularly performs such duties for the manufacturer. The Contractor shall furnish the Contracting Officer a list of names of personnel trained and certified by the pipe system manufacturer in the installation of this system. Only personnel whose names appear on the list will be allowed to install the system. The list shall not be more than 1 year old.

3.2 PIPING SYSTEMS

3.2.1 Buried Insulated Systems

Buried insulated systems shall consist of carrier pipe, insulation, casing, end seals, fittings and accessories as specified.

3.2.2 Buried Uninsulated Systems

Buried uninsulated systems shall consist of carrier pipe, fittings and accessories as specified.

3.3 VALVE MANHOLES AND PIPING EQUIPMENT IN VALVE MANHOLES

Valve manholes and piping and equipment in valve manholes shall be installed in accordance with Section 02570A VALVE MANHOLES AND PIPING AND EQUIPMENT IN VALVE MANHOLES.

3.4 THRUST BLOCKS

Thrust blocks shall be installed at the locations shown or recommended by the pipe system manufacturer. Thrust blocks may not be required on all systems, and the need for thrust blocks shall be as recommended by the system manufacturer. Thrust blocks, if necessary, shall be installed at all changes in direction, changes in size, valves and terminal ends, such as plugs, caps and tees. Thrust blocks shall be concrete having a compressive strength of not less than 14 MPa (2000 psi) after 28 days and shall be in accordance with Section 03300CAST-IN-PLACE STRUCTURAL CONCRETE. Thrust blocks shall be placed between solid ground and the fitting to be anchored. Unless otherwise indicated or directed, the base and the thrust bearing sides of the thrust blocks shall be poured directly against undisturbed earth. The sides of the thrust blocks not subject to thrust may be poured against forms. Thrust blocks shall be placed so that the joints for all fittings will be accessible for repair wherever possible. No pipe joint shall be embedded in concrete unless the assembly has previously been hydrostatically tested. The thrust blocks shall provide for transfer of thrusts and reactions without exceeding the allowable stress of the concrete and shall be installed in accordance with pipe manufacturer's instructions. In muck or peat, all thrusts shall be resisted by piles or tie rods to solid foundations or by removal of peat or muck which shall be replaced with ballast of sufficient stability to resist thrusts.

3.5 INSTALLATION OF PIPING SYSTEMS

The piping system furnished shall be installed in accordance with the piping system manufacturer's instructions. Piping shall be installed without springing or forcing other than what has been calculated for cold spring. Pipe ends shall have burrs removed by reaming and shall be installed to permit free expansion and contraction without damage to joints or hangers. Nonmetallic pipe cut in the field shall be machined to fit couplings or joints and shall be coated or treated to match standard factory coated ends. Copper tubing shall not be installed in the same trench with ferrous piping materials. When nonferrous metallic pipe (e.g., copper tubing) crosses any ferrous piping material, a minimum vertical separation of 300 mm shall be maintained between pipes. Connections between different types of pipe and accessories shall be made with transition fittings approved by the manufacturer of the piping system.

3.5.1 Pitching of Horizontal Piping

Horizontal piping shall be pitched at a grade of not less than 40 mm in 1 m toward the drain points unless otherwise indicated.

3.5.2 Open Ends

Open ends of pipelines and equipment shall be properly capped or plugged during installation to keep dirt and other foreign matter out of the system.

3.5.3 Cutting Prefabricated Piping Sections

Where prefabricated pipe sections are field cut, new end seals similar to the factory applied end seal shall be provided and installed in accordance with the manufacturer's instructions.

3.5.4 Joints

3.5.4.1 Welded Joints

Welded joints between sections of pipe and between pipe and fittings shall be provided where specified or indicated.

3.5.4.2 Threaded Joints

Threaded joints shall not be used belowground. Joints shall be made tight with polytetrafluoroethylene tape applied to the male threads only. Not more than 3 threads shall show after the joint is made up.

3.5.4.3 Grooved Mechanical Joints

Grooves shall be prepared according to the coupling manufacturer's instructions. Grooved fittings, couplings, and grooving tools shall be the products of the same manufacturer. Pipe and groove dimensions shall comply with the tolerances specified by the coupling manufacturer. The diameter of grooves made in the field shall be measured using a "go/no-go" gauge, vernier or dial caliper, narrow-land micrometer, or other method specifically approved by the coupling manufacturer for the intended application. Groove width and dimension of groove from end of pipe shall be measured and recorded for each change in grooving tool setup to verify compliance with coupling manufacturer's tolerances. Grooved joints shall not be used in concealed locations.

3.5.4.4 Brazed Joints

Brazed joints for copper pipe and fittings shall conform to CDA Tube Handbook. Brazing alloys melting above 593.3 degrees C (1100 degrees F) shall be utilized.

3.5.4.5 Nonmetallic Pipe Joints

Nonmetallic pipe joints shall be installed in accordance with the written instructions of the manufacturer.

3.5.5 Expansion Loops

If expansion compensation is needed, expansion loops and expansion bends (Z- and L- type) shall be factory fabricated of casing, insulation, and

carrier piping identical to that furnished for straight runs. Expansion loops and bends shall be properly designed in accordance with the allowable stress limits indicated in ASME B31.1 for the type of pipe used. Expansion loops and bends shall be shipped to the jobsite in the maximum size sections feasible to minimize the number of field joints. The expansion loops and bends casing and insulation where applicable, shall be suitably sized to accommodate pipe movement. Field joints shall be made in straight runs of the expansion loops and bends, and the number shall be kept to a minimum. For steel pipe, cold springing shall not be allowed when sizing the expansion loops and bends, but piping shall be cold sprung one-half the calculated maximum operational expansion during field assembly. Pipe stress in expansion loops and bends shall conform to the requirements for expansion loops specified in ASME B31.1.

3.5.6 Anchors

Anchor design shall be in accordance with the published data of the manufacturer and for prefabricated systems shall be factory fabricated by the prefabricated system manufacturer. In all cases, the design shall be such that water penetration, condensation, or vapor transmission will not wet the insulation.

3.5.7 Field Casing Closures

Field insulation and encasement of joints shall be accomplished after the visual and pressure tests specified are completed. Field insulation and encasement shall be in accordance with the manufacturer's written instructions. Thickness dimensions of the insulation and casing materials shall not be less than those of the adjoining prefabricated section. Insulating material shall be foamed in place polyurethane. Care should be taken to ensure that field closures are made under conditions of temperature and cleanliness required to produce a sound, continuous vapor barrier. A standard polyethylene heat shrink sleeve shall be installed over the casing and shall have a 150 mm minimum overlap at each end.

3.5.8 Underground Warning Tape

Underground warning tape shall be buried above the piping during the trench backfilling and shall be buried approximately 300 mm deep. Tape shall be [0.1 mm thick polyethylene tape] [polyethylene tape with metallic core]. Tape shall be 150 mm wide and be printed with repetitive caution warnings along its length. Tapes shall be yellow in color with black letters. Tape color and lettering shall not be affected by moisture or other substances contained in the backfill material.

3.5.9 Markers for Underground Piping

Markers for underground piping shall be placed as indicated approximately 600 mm to the right of the distribution system and referenced to the flow direction in the supply line. The marker shall be concrete 150 mm square or round section [600] [900] mm long. The top edge of the marker shall have a minimum 10 mm chamfer all around. The letters [CHW] [LHW] [DTW] shall be impressed or cast on the top of the markers to indicate the type of system that is being identified. Each letter shall be formed with a V-shaped groove and shall have a width of stroke at least 6 mm at the top and depth of 6 mm. The top of the marker shall protrude not more than [25] [50] [75] [100] mm above finished grade.

3.6 EARTHWORK

Earthwork shall be performed in accordance with Section 02316A EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.7 ELECTRICAL WORK

Electrical work shall be performed in accordance with either $^{\rm Section\,16375A}$ ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND or Section $^{\rm 16370A}$ ELECTRICAL DISTRIBUTION SYSTEM, AERIAL.

3.8 TESTING

Tests shall be conducted before, during, and after installation of the system. All instruments, equipment, facilities, and labor required to properly conduct the tests shall be provided by the Contractor. Test pressure gauges for a specific test shall have dials indicating not less than 1-1/2 times nor more than 2 times the test pressure. It shall be the Contractor's responsibility to make the pipe system workable at his expense.

3.8.1 Metallic Pipe Welds

An approved independent testing firm or firms regularly engaged in radiographic testing shall perform a radiographic examination of the field welds. The radiographic testing shall be performed in accordance with ASME B31.1. All radiographs shall be reviewed and interpreted by a Certified Level III Radiographer employed by the testing firm. Any welds found to be unacceptable shall be removed, rewelded and radiographically reexamined in accordance with the above criteria. Such repair and reexamination shall be accomplished at no cost to the Government.

3.8.2 Carrier Pipe Cleaning and Testing

Distribution piping shall be tested as required before backfilling and with all joints exposed. The area between joints may be backfilled as necessary to prevent pipe movement.

3.8.2.1 Cleaning Carrier Pipe

Prior to testing, the interior of the carrier pipe shall be cleaned of foreign materials by thorough flushing with clean water. Water shall be circulated at a velocity between 2 and 3 m/s (7 and 10 feet per second) for a minimum of 4 hours. If required, temporary and/or supplementary pumps shall be provided to ensure that required velocity is achieved. System strainers shall be cleaned after the flushing operation is complete. Temporary strainers shall be installed as required. After flushing, the water shall remain in the piping system for testing of the system. All air shall be removed from the system prior to starting the tests.

3.8.2.2 Hydrostatic Pressure Cycling and Tests

Hydrostatic pressure cycling shall have 4 cycles. Each cycle shall consist of a 10 minute period at 1000 kPa followed by a 5 minute period at a pressure less than 350 kPa. The next cycle shall begin immediately following the completion of the previous cycle. Pressure rise and drop shall not exceed 690 kPa per minute. The pressure gauge shall be located and the pressure measured at the opposite end of the system from where the pressure is applied. After completion of the hydrostatic pressure cycling, the first hydrostatic pressure test shall be performed. During the first hydrostatic pressure test, the system shall be proven tight at a pressure

of 1-1/2 times the working pressure up to 1000 kPa. This pressure shall be held for a minimum of 1 hour. The method of pressurizing the system shall be disconnected from the system before starting the 1 hour pressure holding period. If the pressure cannot be held for the specified length of time, the cause of pressure loss shall be determined, corrected and the hydrostatic pressure cycling and first hydrostatic pressure test shall be repeated until the system can hold the required pressure for at least 1 hour. After successful completion of the first hydrostatic pressure test, the water shall be drained out of the piping system and the piping system filled with treated water as defined in paragraph TREATED WATER for the remaining tests and for permanent operation of the system. The hydrostatic pressure cycling and tests shall be repeated after the system has been filled with treated water, using the same test conditions and criteria.

3.8.2.3 Operational Test

Operational test shall be performed on the complete system or testable portions thereof. The test shall be conducted with full design flows and operating temperatures in all runs of piping as if in service, to demonstrate satisfactory function and operating effectiveness. The operational test will have two cycles. Each cycle shall consist of a 6-hour period with treated water in the system at the maximum operating temperature of [____] degrees C and maximum flow rate, and a period of at least 6-hours with no flow. For dual temperature systems, the first cycle shall use the heating temperature of [_____] degrees C and the second cycle the cooling temperature of [_____] degrees C of the designed system. The Contractor shall supply temporary pumps, piping connections, boilers, chillers and the gauges required to circulate the water at the desired temperatures and flow rates. Water shall be circulated through supply lines and returned through the return piping to demonstrate that the pressure drop is compatible with the flow rate and size of pipe and to show that obstructions do not exist in the piping system. Any unusual indicated pressure drop will be investigated and any obstructions removed. Any leaks found shall be repaired. After any obstructions have been removed and any leaks repaired, the operational test shall be repeated until successfully passed.

3.8.2.4 Final Hydrostatic Test

After successful completion of the operational test, the system shall be pressurized to 1-1/2 times the working pressure up to 1000 kPa. This pressure shall be held for a minimum of 4 hours. Means of pressurizing shall be disconnected prior to the start of the 4-hour pressure holding period. If the pressure cannot be held for the specified length of time, the cause of the pressure loss shall be determined, corrected, and all of the hydrostatic pressure cycling and tests repeated.

-- End of Section --

SECTION 02556A

GAS DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN GAS ASSOCIATION (AGA)

(1994; addenda/correction Jan 1996) A.G.A. AGA Manual Plastic Pipe Manual for Gas Service

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

(2000) Diaphragm Type Gas Displacement Meters ANSI B109.2 (500 Cubic Feet per Hour Capacity and Over)

AMERICAN PETROLEUM INSTITUTE (API)

(2000) Line Pipe API Spec 5L

API Spec 6D (1994; Supple 1 Jun 1996; Supple 2 Dec 1997) Pipeline Valves (Gate, Plug, Ball, and Check Valves)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

(1999b) Pipe, Steel, Black and Hot-Dipped, ASTM A 53/A 53M Zinc-Coated, Welded and Seamless (2000) Carbon Steel Forgings, for ASTM A 181/A 181M General-Purpose Piping (2000) Thermoplastic Gas Pressure Pipe, ASTM D 2513 Tubing, and Fittings (2000) Reinforced Epoxy Resin Gas Pressure ASTM D 2517 Pipe and Fittings (1998) Socket-Type Polyethylene Fittings for ASTM D 2683 Outside Diameter-Controlled Polyethylene Pipe and Tubing (1997) Butt Heat Fusion Polyethylene (PE) Plastic Fittings for

ASTM D 3261 Polyethylene (PE) Plastic Pipe and Tubing

ASTM D 3308 (1997) PTFE Resin-Skived Tape ASTM D 3350 (1999) Polyethylene Plastics Pipe and Fittings Materials

ASME INTERNATIONAL (ASME)

	·	
ASM	E B1.20.1	(1983; R 1992) Pipe Threads, General Purpose (Inch)
ASM	E B16.5	(1996; B16.5a) Pipe Flanges and Flanged Fittings NPS 1/2 thru NPS 24
ASM	E B16.9	(1993) Factory-Made Wrought Steel Buttwelding Fittings
ASM	E B16.11	(1996) Forged Fittings, Socket-Welding and Threaded
ASM	E B16.21	(1992) Nonmetallic Flat Gaskets for Pipe Flanges
ASM	E B16.34	(1997) Valves - Flanged, Threaded, and Welding End
ASM	E B16.40	(1985; R 1994) Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems
ASM	E B31.8	(1995) Gas Transmission and Distribution Piping Systems
ASM	E BPVC SEC VIII D1	(1998) Boiler and Pressure Vessel Code; Section VIII, Pressure Vessels Division 1 - Basic Coverage

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

49 CFR 192 Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-2962 (Rev A) Enamel, Alkyd (Metric)

FS TT-E-2784 (Rev A) Enamel (Acrylic-Emulsion, Exterior Gloss and Semigloss) (Metric)

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-25 (1998) Standard Marking System for Valves, Fittings, Flanges and Unions

NACE INTERNATIONAL (NACE)

NACE RP0185 (1996) Extruded, Polyolefin Resin Coating Systems with Soft Adhesives for Underground or Submerged Pipe

NACE RP0274 (1998) High Voltage Electrical Inspection

of Pipeline Coatings Prior to Installation

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 25	(1991) Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments)
SSPC SP 1	(1982) Solvent Cleaning
SSPC SP 3	(1995) Power Tool Cleaning
SSPC SP 6	(1994) Commercial Blast Cleaning
SSPC SP 7	(1994) Brush-Off Blast Cleaning

UNDERWRITERS LABORATORIES (UL)

UL Gas&Oil Dir (1999) Gas and Oil Equipment Directory

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Pipe, Fittings, and Associated Materials; [____], [____]

Drawings shall contain complete schematic and piping diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout and anchorage of the system and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation.

SD-03 Product Data

Materials and Equipment; [____], [____]

A complete list of equipment and materials, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation instructions, including, but not limited to the following:

- a. Dielectric Waterways and Flange Kits.
- b. Meters.
- c. Pressure Reducing Valves.
- d. Regulators.
- e. [Earthquake Actuated Automatic Gas Shutoff System]

f. Emergency Gas Supply Connection.
Spare Parts Data; [], []
Spare parts lists for each different item of material and equipment specified, after approval of the detail drawings and not later than [] months prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.
Connections to Existing Lines; [], []
Notification of the Contractor's schedule for making connections to existing gas lines, at least 10 days in advance.
Welding Steel Piping; [], []
A copy of qualified welding procedures along with a list of names and identification symbols of performance qualified welders and welding operators.
Jointing Polyethylene and Fiberglass Piping; G, []
A copy of qualified jointing procedures, training procedures, qualifications of trainer, and training test results for joiners and inspectors.
Connection and Abandonment Plan; G, []
A copy of procedures for gas line tie in, hot taps, abandonment/removal or demolition, purging, and plugging as applicable in accordance with ASME B31.8.
SD-06 Test Reports
Pressure and Leak Tests; G, []
Data from all pressure tests of the distribution system.
SD-07 Certificates
Utility Work; [], []
Certification from the Operating Agency/Utility Company that work for which the Utility is responsible has been completed.
Training; [], []
A copy of each inspector's and jointer's training certificate with respective test results.
SD-10 Operation and Maintenance Data
Gas Distribution System; [], []
[Six] [] copies, in booklet form and indexed, of site specific natural gas operation and maintenance manual for each gas distribution system including system operation, system maintenance, equipment operation, and equipment maintenance manuals described below. If operation and maintenance manuals are

provided in a common volume, they shall be clearly differentiated and separately indexed.

The System Operation Manual shall include but not be limited to the following:

- a. Maps showing piping layout and locations of all system valves and gas line markers.
- b. Step-by-step procedures required for system startup, operation, and shutdown. System components and equipment shall be indexed to the gas maps.
- c. Isolation procedures and valve operations to shut down or isolate each section of the system. Valves and other system components shall be indexed to the gas maps.
- d. Descriptions of Site Specific Standard Operation Procedures including permanent and temporary pipe repair procedures, system restart and test procedures for placing repaired lines back in service, and procedures for abandoning gas piping and system components.
- e. Descriptions of Emergency Procedures including: isolation procedures including required valve operations with valve locations indexed to gas map, recommended emergency equipment, checklist for major emergencies and procedures for connecting emergency gas supply.

The Equipment Operation Manual shall include, but not be limited to, detail drawings, equipment data, and manufacturer supplied operation manuals for all equipment, valves and system components.

The System Maintenance Manuals shall include, but not be limited to:

- a. Maintenance check list for entire gas distribution system.
- $\ensuremath{\text{b.}}$ Descriptions of site specific standard maintenance procedures.
- c. Maintenance procedures for installed cathodic protection systems.
- d. Piping layout, equipment layout, and control diagrams of the systems as installed.
- e. Identification of pipe materials and manufacturer by location, pipe repair procedures, and jointing procedures at transitions to other piping materials or piping from different manufacturer.

The Equipment Maintenance Manuals shall include but not be limited to the following:

- a. Identification of valves and other equipment by materials, manufacturer, vendor identification and location.
 - b. Maintenance procedures and recommended maintenance tool

kits for all valves and equipment.

- c. Recommended repair methods, either field repair, factory repair, or whole-item replacement for each valve component or piece of equipment or component item.
- d. Routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide.

1.3 GENERAL REQUIREMENTS

1.3.1 Welding Steel Piping

Welding and nondestructive testing procedures for pressure piping are specified in Section 05093 WELDING PRESSURE PIPING. Structural members shall be welded in accordance with Section 05090 WELDING, STRUCTURAL.

1.3.2 Jointing Polyethylene and Fiberglass Piping

Piping shall be joined by performance qualified joiners using qualified procedures in accordance with AGA Manual. Manufacturer's prequalified joining procedures shall be used. Joints shall be inspected by an inspector qualified in the joining procedures being used and in accordance with AGA Manual. Joiners and inspectors shall be qualified at the jobsite by a person who has been trained and certified by the manufacturer of the pipe, to train and qualify joiners and inspectors in each joining procedure to be used on the job. Training shall include use of equipment, explanation of the procedure, and successfully making joints which pass tests specified in AGA Manual. The Contracting Officer shall be notified at least 24 hours in advance of the date to qualify joiners and inspectors.

1.3.3 Standard Products

Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Asbestos or products containing asbestos shall not be used. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Valves, flanges, and fittings shall be marked in accordance with MSS SP-25.

1.3.4 Verification of Dimensions

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

1.3.5 Handling

Pipe and components shall be handled carefully to ensure a sound, undamaged condition. Particular care shall be taken not to damage pipe coating. No pipe or material of any kind shall be placed inside another pipe or fitting after the coating has been applied, except as specified in paragraph INSTALLATION. Plastic pipe shall be handled in conformance with AGA Manual.

PART 2 PRODUCTS

2.1 PIPE, FITTINGS, AND ASSOCIATED MATERIALS

2.1.1 Steel Pipe

Steel pipe shall conform to ASTM A 53/A 53M, Grade A or B, Type E or S, Schedule 40; or API Spec 5L seamless or electric resistance welded, Schedule 40, black steel pipe as specified in ASME B31.8. Furnace buttwelded pipe may be used in sizes 40 mm (1-1/2 inches) and smaller.

2.1.2 Small Fittings

Fittings 40 mm (1-1/2 inches) and smaller shall conform to ASME B16.11.

2.1.3 Fittings, 50 mm (2 Inches) and Larger

Pipe flanges and flanged fittings including bolts, nuts, and bolt patterns shall be in accordance with ASME B16.5, Class [_____]. Buttweld fittings shall be in accordance with ASME B16.9. Weld neck flanges shall be used.

2.1.4 Steel Forged Branch Connections

Connections shall conform to ASTM A 181/A 181M, Class 60, carbon steel.

2.1.5 Flange Gaskets

Gaskets shall be non-asbestos compressed material in accordance with ASME B16.21, 1.6 mm (1/16 inch) minimum thickness, full face or self-centering flat ring type. The gaskets shall contain aramid fibers bonded with nitrile butadiene rubber (NBR), or glass fibers bonded with polytetrafluoroethylene, suitable for maximum 315 degrees C service and meeting applicable requirements of ASME B31.8.

2.1.6 Pipe Threads

Pipe threads shall conform to ASME B1.20.1.

2.1.7 Polyethylene Pipe, Tubing, Fittings and Joints

Polyethylene pipe, tubing, fittings and joints shall conform to ASTM D 3350 and ASTM D 2513, pipe designations PE 2406 and PE 3408, rated SDR [____] or less, as specified in ASME B31.8. Pipe sections shall be marked as required by ASTM D 2513. Butt fittings shall conform to ASTM D 3261 and socket fittings shall conform to ASTM D 2683. Fittings shall match the service rating of the pipe. Minimum wall thickness shall be [____].

2.1.8 Fiberglass Pipe, Fittings and Adhesive

Fiberglass pipe, fittings and adhesive shall conform to ASTM D 2517. Pipe sections shall be marked as required by ASTM D 2517. Minimum wall thickness shall be [_____].

- 2.1.9 Sealants for Steel Pipe Threaded Joints
- 2.1.9.1 Sealing Compound

Joint sealing compound shall be as listed in UL Gas&Oil Dir, Class 20 or less.

2.1.9.2 Tape

Polytetrafluoroethylene tape shall conform to ASTM D 3308.

2.1.10 Identification

Pipe flow markings and metal tags for each valve, meter, and regulator shall be provided as required by the Contracting Officer.

2.1.11 Insulating Joint Materials

Insulating joint materials shall be provided between flanged or threaded metallic pipe systems where shown to isolate galvanic or electrolytic action.

2.1.11.1 Threaded Joints

Joints for threaded pipe shall be steel body nut type, dielectric waterways with insulating gaskets.

2.1.11.2 Flanged Joints

Joints for flanged pipe shall consist of full face sandwich-type flange insulating gasket of the dielectric type, insulating sleeves for flange bolts and insulating washers for flange nuts.

2.1.11.3 Dielectric Waterways and Flanges

Dielectric waterways shall have temperature and pressure rating equal to or greater than that specified for the connecting piping. Waterways shall have metal connections on both ends suited to match connecting piping. Dielectric waterways shall be internally lined with an insulator specifically designed to prevent current flow between dissimilar metals. Dielectric flanges shall meet the performance requirements described herein for dielectric waterways.

2.1.12 Gas Transition Fittings

Gas transition fittings shall be manufactured steel fittings approved for jointing steel and polyethylene or fiberglass pipe. Approved transition fittings are those that conform to AGA Manual requirements for transition fittings.

2.2 VALVES

Valves shall be suitable for shutoff or isolation service and shall conform to the following:

2.2.1 Steel Valves

Steel valves 40 mm (1-1/2 inches) and smaller installed underground shall conform to ASME B16.34, carbon steel, socket weld ends, with square wrench operator adaptor. Steel valves 40 mm (1-1/2 inches) and smaller installed aboveground shall conform to ASME B16.34, carbon steel, socket weld or threaded ends with handwheel or wrench operator. Steel valves 50 mm (2 inches) and larger installed underground shall conform to API Spec 6D, carbon steel, buttweld ends, Class [____] with square wrench operator adaptor. Steel valves 50 mm (2 inches) and larger installed aboveground shall conform to API Spec 6D, carbon steel, buttweld or flanged ends, Class [____] with handwheel or wrench operator.

2.2.2 Steel Valve Operators

Valves 200 mm (8 inches) and larger shall be provided with worm or spur gear operators, totally enclosed, grease packed, and sealed. The operators shall have Open and Closed stops and position indicators. Locking feature shall be provided where indicated. Wherever the lubricant connections are not conveniently accessible, suitable extensions for the application of lubricant shall be provided. Valves shall be provided with lubricant compatible with gas service.

2.2.3 Polyethylene Valves

Polyethylene valves shall conform to ASME B16.40. Polyethylene valves, in sizes 15 mm to 150 mm (1/2 inch to 6 inches), may be used with polyethylene distribution and service lines, in lieu of steel valves, for underground installation only.

2.3 PRESSURE REGULATORS

Regulators shall have ferrous bodies, shall provide backflow and vacuum protection, and shall be designed to meet the pressure, load and other service conditions.

2.3.1 Gas Main Regulators

Pressure regulators for main distribution lines, supplied from a source of gas which is at a higher pressure than the maximum allowable operating pressure for the system, and shall be equipped with pressure regulating devices of adequate capacity. In addition to the pressure regulating devices, a suitable method shall be provided to prevent overpressuring of the system in accordance with ASME B31.8. Suitable protective devices are as follows:

- a. Spring-loaded relief valve meeting the provisions of ASME BPVC SEC VIII D1.
- b. Pilot-loaded back pressure regulator used as relief valve, so designed that failure of the pilot system will cause the regulator to open.
 - c. Weight-loaded relief valves.
- d. Monitoring regulator installed in series with the primary pressure regulator.
- e. Series regulator installed upstream from the primary regulator, set to limit the pressure on the inlet of the primary regulator continuously to the maximum allowable operating pressure of the system, or less.
- f. Automatic shutoff device installed in series with the primary regulator, set to shut off when the pressure on the distribution system reaches the maximum allowable operating pressure of the system, or less. This device shall remain closed until manually reset.
 - g. Spring-loaded, diaphragm type relief valves.

2.3.2 Service Line Regulators

Pressure regulators for individual service lines shall have ferrous bodies. Regulator shall be capable of reducing distribution line pressure to

pressures required for users. Regulators shall be provided where gas will be distributed at pressures in excess of 2.5 kPa (10 inches of water Pressure relief shall be set at a lower pressure than would cause unsafe operation of any connected user. Regulators for liquified petroleum gas shall be adjusted to 2.5 to 3 kPa (10 to 12 inches of water Pressure relief for liquified petroleum gas shall be set at 4 kPa (16 inches of water column). Regulator shall have single port with orifice diameter no greater than that recommended by the manufacturer for the maximum gas pressure at the regulator inlet. Regulator valve vent shall be of resilient materials designed to withstand flow conditions when pressed against the valve port. Regulator shall be capable of regulating downstream pressure within limits of accuracy and shall be capable of limiting the buildup of pressure under no-flow conditions to 50 percent or less of the discharge pressure maintained under flow conditions. Regulator shall have a self contained service regulator. Regulator pipe connections shall not exceed 50 mm (2 inch) size.

2.4 METERS

Meters shall conform to ANSI B109.2. Meters shall be [pipe] [pedestal] mounted [and be provided with a strainer immediately upstream]. [Meters shall be provided with [over-pressure protection as specified in ASME B31.8] [tamper-proof protection] [frost protection] [fungus-proof protection].] Meters shall be suitable for accurately measuring and handling gas at pressures, temperatures, and flow rates indicated. Meters shall have a pulse switch initiator capable of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. It shall provide not less than one pulse per 2.83 cubic meter (100 cubic feet) of gas.

2.5 EARTHQUAKE ACTUATED AUTOMATIC GAS SHUTOFF SYSTEM

Earthquake Actuated Automatic Gas Shutoff devices shall conform to [____] [and] [requirements furnished by the Contracting Officer], and shall be listed by the State of California, Division of the State Architect as being tested and in conformance with specified requirements. The system shall safely interrupt the flow of gas to the building due to strong ground shaking of an earthquake.

2.6 EMERGENCY GAS SUPPLY CONNECTION

The emergency gas supply connection shall consist of piping (same size as service line) and accessories that will enable a portable, commercial-sized gas cylinder system to be connected to the gas piping system. This connection shall be capped to prevent gas leakage with a lockable manual valve located to be capable of shutting off flow. The entire assembly should be contained in a weatherproof, lockable box. The box shall contain permanently installed written instructions stating the type and pressure of the gas allowed to be connected to the line. The instructions shall also indicate and provide specific instruction for testing of the integrity of the building's gas system with an inert gas before the fuel gas connection is made. A subplate shall be provided in the box that is required to be unbolted to gain access to the connection. The subplate shall contain a warning regarding the potential consequences of using gas other than that specified or of failing to test system integrity before hooking up emergency fuel supply.

2.7 PROTECTIVE COVERING MATERIALS

Continuously extruded polyethylene and adhesive coating system materials shall conform to NACE RP0185, Type A.

2.8 TELEMETERING OR RECORDING GAUGES

Each distribution system supplied by more than one district pressure regulating station shall be equipped with telemetering or recording pressure gauges to indicate the gas pressure in the district line.

PART 3 EXECUTION

3.1 EXCAVATION AND BACKFILLING

Earthwork shall be as specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.2 GAS MAINS

Pipe for gas mains shall be [steel] [polyethylene] [or] [fiberglass]. [Steel pipe and fittings shall be coated with protective covering as specified.] [Polyethylene or fiberglass mains shall not be installed aboveground.]

3.3 SERVICE LINES AND EMERGENCY GAS SUPPLY CONNECTION

Service lines shall be constructed of materials specified for gas mains and shall extend from a gas main to and including the point of delivery within 1.5 meters (5 feet) of the building. The point of delivery is the [meter set assembly] [service regulator] [shutoff valve]. The service lines shall be connected to the gas mains [as indicated] [through service tees, with end of run plugged]. Where indicated, service line shall be provided with an isolation valve of the same size as the service line. The service lines shall be as short and as straight as practicable between the point of delivery and the gas main and shall not be bent or curved laterally unless necessary to avoid obstructions or otherwise permitted. Service lines shall be laid with as few joints as practicable using standard lengths of pipe. Shorter lengths shall be used only for closures. Polyethylene or fiberglass service lines shall not be installed aboveground except as permitted in ASME B31.8.

3.3.1 Emergency Gas Supply Connection

An aboveground locked, valved and capped emergency gas supply connection shall be provided [downstream] [upstream] of the pressure regulator. The connection shall be located outside of the building within 300 mm (12 inches) of the exterior wall and installed in a weatherproof box which is mounted on the exterior wall and clearly marked with an appropriate metal sign mounted on wall above.

3.4 WORKMANSHIP AND DEFECTS

Pipe, tubing, and fittings shall be clear and free of cutting burrs and defects in structure or threading and shall be thoroughly brushed and blown free of chips and scale. Defective pipe, tubing, or fittings shall be replaced and shall not be repaired.

3.5 PROTECTIVE COVERING

3.5.1 Protective Covering for Underground Steel Pipe

Except as otherwise specified, protective coverings shall be applied mechanically in a factory or field plant especially equipped for the purpose. Valves and fittings that cannot be coated and wrapped mechanically shall have the protective covering applied by hand, preferably at the plant that applies the covering to the pipe. Joints shall be coated and wrapped by hand. Hand coating and wrapping shall be done in a manner and with materials that will produce a covering equal in thickness to that of the covering applied mechanically.

3.5.1.1 Thermoplastic Resin Coating System

The coating system shall conform to NACE RP0185, Type A. The exterior of the pipe shall be cleaned to a commercial grade blast cleaning finish in accordance with SSPC SP 6. Adhesive compound shall be applied to the pipe. Immediately after the adhesive is applied, a seamless tube of polyethylene shall be extruded over the adhesive to produce a bonded seamless coating. The nominal thickness of the pipe coating system shall be 0.25 mm (10 mils) (plus or minus 10 percent) of adhesive and 1.0 mm (40 mils) (plus or minus 10 percent) of polyethylene for pipes up to 400 mm (16 inches) in diameter. For pipes 450 mm (18 inches) and larger in diameter, the pipe coating system thickness shall be 0.25 mm (10 mils) (plus or minus 10 percent) adhesive and 1.5 mm (60 mils) (plus or minus 10 percent) polyethylene. Joint coating and field repair material shall be applied as recommended by the coating manufacturer and shall be one of the following:

- a. Heat shrinkable polyethylene sleeves.
- b. Polyvinyl chloride pressure-sensitive adhesive tape.
- c. High density polyethylene/bituminous rubber compound tape.

The coating system shall be inspected for holes, voids, cracks, and other damage during installation.

3.5.1.2 Inspection of Pipe Coatings

Any damage to the protective covering during transit and handling shall be repaired before installation. After field coating and wrapping has been applied, the entire pipe shall be inspected by an electric holiday detector with impressed current set at a value in accordance with NACE RP0274 using a full-ring, spring-type coil electrode. The holiday detector shall be equipped with a bell, buzzer, or other type of audible signal which sounds when a holiday is detected. All holidays in the protective covering shall be repaired immediately upon detection. The Contracting Officer reserves the right to inspect and determine the suitability of the detector. Labor, materials, and equipment necessary for conducting the inspection shall be furnished by the Contractor.

3.5.2 Protective Covering for Aboveground Piping Systems

Finish painting shall conform to the applicable paragraphs of Section 09900 PAINTING, GENERAL and as follows:

3.5.2.1 Ferrous Surfaces

Shop primed surfaces shall be touched up with ferrous metal primer same type paint as the shop primer. Surfaces that have not been shop primed

shall be solvent-cleaned in accordance with SSPC SP 1. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be mechanically cleaned by power wire brushing in accordance with SSPC SP 3 or brush-off blast cleaned in accordance with SSPC SP 7 and primed with ferrous metal primer in accordance with SSPC Paint 25. Primed surfaces shall be finished with two coats of exterior alkyd paint conforming to CID A-A-2962 Type I, Class [A] [B], Grade B.

3.5.2.2 Nonferrous Surfaces

[Nonferrous surfaces shall not be painted.] [Nonferrous surfaces shall be painted due to corrosive conditions. The surfaces shall be solvent-cleaned in accordance with SSPC SP 1. A first coat of FS TT-E-2784, Type III, Flat, and 2 coats of FS TT-E-2784, Enamel [Type I, Gloss] [or] [Type II, Semigloss] shall be applied.]

3.5.3 Protective Covering for Piping in Valve Boxes and Manholes

Piping in valve boxes or manholes shall receive protective coating as specified for underground steel pipe.

3.6 INSTALLATION

Gas distribution system and equipment shall be installed in conformance with the manufacturer's recommendations and applicable sections of ASME B31.8, AGA Manual and 49 CFR 192. Abandoning existing gas piping shall be done in accordance with ASME B31.8. Pipe shall be cut without damaging the pipe. Unless otherwise authorized, cutting shall be done by an approved type of mechanical cutter. Wheel cutters shall be used where practicable. On steel pipe 150 mm (6 inches and larger, an approved gas-cutting-and-beveling machine may be used. Cutting of plastic pipe shall be in accordance with AGA Manual. Valve installation in plastic pipe shall be designed to protect the plastic pipe against excessive torsional or shearing loads when the valve is operated and from other stresses which may be exerted through the valve or valve box.

3.6.1 Installing Pipe Underground

Gas mains and service lines shall be graded as indicated. Joints in steel pipe shall be welded except as otherwise permitted for installation of valves. Mains shall have 600 mm minimum cover; service lines shall have 485 mm minimum cover; and both mains and service lines shall be placed on firmly compacted select material for the full length. Where indicated, the main shall be encased, bridged, or designed to withstand any anticipated external loads as specified in ASME B31.8. The encasement material shall be standard weight black steel pipe with a protective coating as specified. The pipe shall be separated from the casing by insulating spacers and sealed at the ends with casing bushings. Trench shall be excavated below pipe grade, bedded with bank sand, and compacted to provide full-length bearing. Laying the pipe on blocks to produce uniform grade will not be permitted. The pipe shall be clean inside before it is lowered into the trench and shall be kept free of water, soil, and all other foreign matter that might damage or obstruct the operation of the valves, regulators, meters, or other equipment. When work is not in progress, open ends of pipe or fittings shall be securely closed by expandable plugs or other suitable means. Minor changes in line or gradient of pipe that can be accomplished through the natural flexibility of the pipe material without producing permanent deformation and without overstressing joints may be made when approved. Changes in line or gradient that exceed the

limitations specified shall be made with fittings. When cathodic protection is furnished, electrically insulated joints or flanges shall be provided. When polyethylene or fiberglass piping is installed underground, foil backed magnetic tape shall be placed above the pipe to permit locating with a magnetic detector. After laying of pipe and testing, trench shall be backfilled in accordance with Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS.

3.6.2 Installing Pipe Aboveground

Aboveground piping shall be protected against dirt and other foreign matter as specified for underground piping. Joints in steel pipe shall be welded; however, joints in pipe 40 mm (1-1/2 inches) in diameter and smaller may be threaded; joints may also be threaded to accommodate the installation of valves. Flanges shall be of the weld neck type to match wall thickness of pipe.

3.7 PIPE JOINTS

Pipe joints shall be designed and installed to effectively sustain the longitudinal pullout forces caused by the contraction of piping or superimposed loads.

3.7.1 Threaded Steel Joints

Threaded joints in steel pipe shall have tapered threads evenly cut and shall be made with UL approved graphite joint sealing compound for gas service or polytetrafluoroethylene tape applied to the male threads only. Caulking of threaded joints to stop or prevent leaks will not be permitted.

3.7.2 Welded Steel Joints

Gas pipe weldments shall be as indicated. Changes in direction of piping shall be made with welding fittings only; mitering or notching pipe to form elbows and tees or other similar type construction will not be permitted. Branch connection may be made with either welding tees or forged branch outlet fittings. Branch outlet fittings shall be forged, flared for improvement of flow where attached to the run, and reinforced against external strains. Beveling, alignment, heat treatment, and inspection of weld shall conform to ASME B31.8. Weld defects shall be removed and repairs made to the weld, or the weld joints shall be entirely removed and rewelded. After filler metal has been removed from its original package, it shall be protected or stored so that its characteristics or welding properties are not affected adversely. Electrodes that have been wetted or have lost any of their coating shall not be used.

3.7.3 Polyethylene and Fiberglass Pipe Jointing Procedures

Jointing procedures shall conform to AGA Manual. Indiscriminate heat fusion joining of plastic pipe or fittings made from different polyethylene resins by classification or by manufacturer shall be avoided if other alternative joining procedures are available. If heat fusion joining of dissimilar polyethylenes is required, special procedures are required. The method of heat fusion joining dissimilar polyethylene resins shall be tested in accordance with paragraph TESTS, subparagraph Destructive Tests of Plastic Pipe Joints.

3.7.4 Connections Between Metallic and Plastic Piping

Connections shall be made only outside, underground, and with approved transition fittings.

3.8 VALVE BOXES

Valve boxes of cast iron not less than 4.7 mm (3/16 inch) thick shall be installed at each underground valve except where concrete or other type of housing is indicated. Valve boxes shall be provided with locking covers that require a special wrench for removal. Wrench shall be furnished for each box. The word "gas" shall be cast in the box cover. When the valve is located in a roadway, the valve box shall be protected by a suitable concrete slab at least 1 square meter. When in a sidewalk, the top of the box shall be in a concrete slab 600 mm square and set flush with the sidewalk. Boxes shall be adjustable extension type with screw or slide-type adjustments. Valve boxes shall be separately supported, not resting on the pipe, so that no traffic loads can be transmitted to the pipe. Valves shall only be located in valve boxes or inside of buildings.

3.9 DRIPS

Drips shall be installed at locations where indicated. Drips shall conform to the details shown or may be commercial units of approved type and capacity. A blow off pipe 32 mm (1-1/4 inches) or larger shall be connected to each drip at its lowest point and shall extend to or near the ground surface at a convenient location away from traffic. Discharge for each drip terminal (outlet) shall be provided with a reducing fitting, a plug valve, and a 15 mm (1/2 inch nipple turned down. The discharge terminal (outlet) shall be inside a length of 300 mm or larger vitrified clay pipe, concrete sewer pipe or concrete terminal box [set vertically on a bed of coarse gravel 300 mm thick and 1 m square,] [with concrete bottom to contain liquids and a connection to remove liquids for disposal,] and closed at the ground surface with a suitable replacement cover.

3.10 PRESSURE REGULATOR INSTALLATION

3.10.1 Main Distribution Line Regulators

Pressure regulators shall be installed where shown. A valve shall be installed on each side of the regulator for isolating the regulator for maintenance. A bypass line with bypass valves or 3 way valves and an overpressurization pressure regulating device shall be provided. Regulators and valves shall be installed in rectangular reinforced concrete boxes. Boxes shall be large enough so that all required equipment can be properly installed, operated, and maintained. Sidewalls shall extend above ground line. The boxes shall be provided with [steel door] [cast iron manhole] covers with locking provisions and 100 mm (4 inch) diameter vents. One key or other unlocking device shall be furnished with each cover. Discharge stacks, vents, or outlet ports of all pressure relief devices shall be located where gas can be discharged into the atmosphere without undue hazard. Stacks and vents shall be provided with fittings to preclude entry of water.

3.10.2 Service Line Regulators

A shutoff valve, meter set assembly, and service regulator shall be installed on the service line outside the building, 450 mm above the ground on the riser. An insulating joint shall be installed on the inlet side of the meter set assembly and service regulator and shall be constructed to prevent flow of electrical current. A 10 mm (3/8 inch)

tapped fitting equipped with a plug shall be provided on both sides of the service regulator for installation of pressure gauges for adjusting the regulator. All service regulator vents and relief vents shall terminate in the outside air in rain and insect resistant fittings. The open end of the vent shall be located where gas can escape freely into the atmosphere, away from any openings into the building and above areas subject to flooding.

3.11 METER INSTALLATION

Meters shall be installed in accordance with ASME B31.8. Permanent gas meters shall be installed with provisions for isolation and removal for calibration and maintenance, and shall be suitable for operation in conjunction with an energy monitoring and control system.

3.12 CONNECTIONS TO EXISTING LINES

Connections between new work and existing gas lines, where required, shall be made in accordance with ASME B31.8, using proper fittings to suit the actual conditions. When connections are made by tapping into a gas main, the connecting fittings shall be the same size as the pipe being connected.

3.12.1 Connections to Publicly or Privately Operated Gas Utility Lines

Contractor shall provide materials for the connections to the existing gas lines. Final connections and the turning on of gas shall be made by the utility. Existing lines that are to be a abandoned or taken out of service shall be disconnected, purged and capped, plugged or otherwise effectively sealed by the Utility. The Contractor shall notify the Contracting Officer, in writing, 10 days before final connections and turning on of gas lines. The Contractor shall make necessary arrangements with the Utility for tie in and activation of new gas lines. Only the Operating Agency/Utility Company may reactivate the system after tie in. The Contractor shall furnish a certification by the Operating Agency/Utility Company that all Utility work has been satisfactorily completed.

3.12.2 Connection to Government Owned/Operated Gas Lines

The Contractor shall provide connections to the existing gas lines in accordance with approved procedures. Deactivation of any portion of the existing system shall only be done at the valve location shown on the drawings. Reactivation of any existing gas lines will only be done by the Government. The Contractor's Connection and Abandonment Plan shall be submitted and approved prior to making any connections to existing gas lines. This plan shall include the Operating Agency's required procedures which may be obtained from [____]. The Contractor shall notify the Contracting Officer, in writing, 10 days before connections to existing lines are to be made.

- a. If facilities are abandoned in place, they shall be physically disconnected from the piping system. The open ends of all abandoned facilities shall be purged, capped, plugged or otherwise effectively sealed. Abandonment shall not be completed until it has been determined that the volume of gas or liquid hydrocarbons contained within the abandoned section poses no potential hazard. Air or inert gas may be used for purging, or the facility may be filled with water or other inert material. If air is used for purging, the Contractor shall ensure that a combustible mixture is not present after purging.
 - b. When a main is abandoned, together with the service lines

connected to it, only the customer's end of such service lines is required to be sealed as stipulated above.

- c. Service lines abandoned from the active mains shall be disconnected as close to the main as practicable.
 - d. All valves left in the abandoned segment shall be closed.
- e. All abovegrade valves, risers, and vault and valve box covers shall be removed. Vault and valve box voids shall be filled with suitable compacted backfill material.

3.13 CATHODIC PROTECTION

Cathodic protection shall be provided for all metallic gas piping installed underground and shall be installed as specified in [Section 13110CATHODIC PROTECTION SYSTEM (SACRIFICIAL ANODE)] [Section 13112 CATHODIC PROTECTION SYSTEM (IMPRESSED CURRENT)].

3.14 TESTS

3.14.1 Destructive Tests of Plastic Pipe Joints

Each day, prior to making polyethylene heat fusion joints or fiberglass adhesive joints, a joint of each size and type to be installed that day shall be made by each person performing joining of plastic pipe that day and destructively tested. At least 3 longitudinal straps shall be cut from each joint. Each strap shall be visually examined, shall not contain voids or discontinuities on the cut surfaces of the joint area, and shall be deformed by bending, torque, or impact, and if failure occurs, it must not initiate in the joint area. If a joint fails the visual or deformation test, the qualified joiner who made that joint shall not make further field joints in plastic pipe on this job until that person has been retrained and requalified. The results of the destructive tests shall be recorded to include the date and time of the tests, size and type of the joints, ambient conditions, fusion iron temperature and names of inspectors and joiners.

3.14.2 Pressure and Leak Tests

The system of gas mains and service lines shall be tested after construction and before being placed in service using air as the test medium. The normal operating pressure for the system is [____]. The test pressure is [____]. Prior to testing the system, the interior shall be blown out, cleaned and cleared of all foreign materials. All meters, regulators, and controls shall be removed before blowing out and cleaning and reinstalled after clearing of all foreign materials. Testing of gas mains and service lines shall be done with due regard for the safety of employees and the public during the test. Persons not working on the test operations shall be kept out of the testing area while testing is proceeding. The test shall be made on the system as a whole or on sections that can be isolated. Joints in sections shall be tested prior to backfilling when trenches must be backfilled before the completion of other pipeline sections. The test shall continue for at least 24 hours from the time of the initial readings to the final readings of pressure and temperature. The initial test readings of the instrument shall not be made for at least 1 hour after the pipe has been subjected to the full test pressure, and neither the initial nor final readings shall be made at times of rapid changes in atmospheric conditions. The temperatures shall be

representative of the actual trench conditions. There shall be no indication of reduction of pressure during the test after corrections have been made for changes in atmospheric conditions in conformity with the relationship T(1)P(2)=T(2)P(1), in which T and P denote absolute temperature and pressure, respectively, and the numbers denote initial and final readings. During the test, the entire system shall be completely isolated from all compressors and other sources of air pressure. Each joint shall be tested by means of soap and water or an equivalent nonflammable solution prior to backfilling or concealing any work. The testing instruments shall be approved by the Contracting Officer. All labor, materials and equipment for conducting the tests shall be furnished by the Contractor and shall be subject to inspection at all times during the tests. The Contractor shall maintain safety precautions for air pressure testing at all times during the tests.

-- End of Section --

SECTION 02791

PLAYGROUND PROTECTIVE SURFACING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 412	(1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 648	(2000) Deflection Temperature of Plastics Under Flexural Load
ASTM D 1557	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2047	(1999) Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
ASTM D 6112	(1997) Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes
ASTM E 1912	(1998) Standard Guide for Accelerated Site Characterization for Confirmed or Suspected Petroleum Releases
ASTM F 1292	(1999) Impact Attenuation of Surface Systems Under and Around Playground Equipment
ASTM F 1487	(1998) Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

CPSC Pub No 325 (1994) Handbook for Public Playground Safety

1.2 DEFINITIONS

Critical Height: The fall height at which the protective surfacing meets the requirements of ASTM F 1292.

Designated Play Surface: Any elevated surface for standing, walking, sitting, or climbing; or a flat surface a minimum 50 mm wide having up to

a maximum 30 degree angle from horizontal. In some play events the platform surface will be the same as the designated play surface. However, the terms should not be interchanged as they do not define the same point of measurement according to ASTM F 1487.

Head Injury Criteria (HIC): A measure of impact severity that considers the duration over which the most critical section of the deceleration pulse persists as well as the peak level of that deceleration. Head impact injuries are not believed to be life threatening if the HIC does not exceed a value of 1,000.

Impact Attenuation: The ability of protective surfacing to reduce and dissipate the energy of an impacting body.

Loose Fill: Consisting of small independent movable components such as sand, gravel, or wood chip. The percent of fine material in the loose fill affects its compression properties from rainfall.

Maximum Equipment Height: The highest point on the equipment (i.e.: roof ridge, top of support pole.

Play Event: A piece of manufactured playground equipment that supports one or more play activities.

1.3 CHILD SAFETY AND ACCESSIBILITY STANDARDS

The perimeters of the play event use zone shall be measured in accordance with the requirements of Section 02882 PLAYGROUND EQUIPMENT.

1.3.1 CHILD SAFETY

Synthetic surfacing and loose-fill surfacing systems installed in the use zones shall meet or exceed the impact attenuating performance requirements as follows. The surfacing critical height value shall yield up to both a maximum 200 G's peak deceleration, and a maximum 1,000 Head Injury Criteria (HIC) value for a head-first fall from the play event in accordance with CPSC Pub No 325 and ASTM F 1292. The protective surfacing should have a minimum critical height value equal to the height of the highest designated play surface. Measuring fall heights for play events is defined in paragraph FALL HEIGHT. Sand, gravel, and wood products shall not be installed over a concrete or bituminous subsurface per CPSC Pub No 325.

1.3.2 CHILD ACCESSIBILITY

The accessibility requirement in accordance with ASTM F 1487 includes the following: When the play event use zone consists of a protective surfacing rated as unaccessible, at least one accessible route shall be provided from the use zone perimeter to the play event. When there is more than one of the same play activity provided, only one shall meet accessibility requirements i.e.: one swing seat or one spring rocking play event). When the access and egress points are not the same for a play event, an accessible route shall be provided to both. The accessible route shall access all accessible play events and elements. The protective surfacings that meet accessibility are synthetic surfacing and engineered wood fiber per ASTM E 1912. When the accessible surface is within the use zone, it shall meet the requirements of paragraph CHILD SAFETY

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; GA.

Scale drawings defining the revised use zone configuration.

Finished Grade and Underground Utilities; FIO

Finished grade, underground utilities, storm-drainage system and irrigation system status; and location of underground utilities and facilities.

SD-03 Product Data

Synthetic Surfacing; FIO Loose Fill Surfacing; FIO Geotextile Fabric; FIO

Manufacturer's descriptive data; catalogue cuts; and the latest edition of ASTM F 1487 and CPSC Pub No 325.

Manufacturer's specifications, handling and storage requirements, installation procedures, and safety data sheets to include warnings and critical height performance standards for synthetic surfacing and loose fill surfacing.

A list to include part numbers of furnished protective surfacing materials and components for synthetic surfacing and loose fill surfacing

Delivery schedule and manufacturer name for synthetic surfacing and loose fill surfacing plus delivery, storage and handling information.

Impact attenuation and critical height performance for each thickness of synthetic surfacing and loose fill surfacing provided.

Manufacturer's Qualification; FIO

Name of the owner or user; service or preventive maintenance provider; date of the installation; point of contact and telephone number; and address for 10 sites.

Wood; FIO

Wood components obtained from managed forests.

Site Preparation; FIO

Playground equipment and site furnishings installed.

Temperature Limitation; [FIO]

Temperature limitation for applying adhesive.

Wood By-Products; FIO

Composition, source; particle size; free from toxic chemicals; poisonous plant material; protrusions; or hazardous material.

Adhesive; FIO

EPA registered uses, toxicity levels, and application hazards.

Color; FIO

[Two] color charts displaying surfacing colors, color granule percentages and finishes.

SD-04 Samples

Synthetic Surfacing; GA Loose Fill Surfacing;

- a. Synthetic Surfacing: A minimum 50 by 50 mm sample.
- b. Loose Fill Surfacing: A minimum 0.003 cu. m sample.

SD-06 Test Reports

Percolation Test; FIO

A certified report of inspection, test method used and compliance with recognized test standard shall be described.

Recycled Plastic; FIO

Individual component and assembled unit structural integrity test; creep tolerance; deflection tolerance; and vertical load test results. The estimated percentage of recovered material content in the material and components. Life-cycle durability.

Synthetic Surfacing; FIO

Chemical composition, color granule percentage, and test results to which material has been subjected; identifying each material and component containing recycled materials and showing the estimated percentage of recovered material content. Freezing temperature life-cycle durability.

Sand; FIO Gravel; FIO

Sieve test results. Sand shall be uniformly graded.

SD-07 Certificates

Materials; FIO

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements.

Certified copies of the material certificates shall include composition and tests to which the material has been subjected.

Manufacturer's Qualification; FIO

Certificate of Insurance AA rated for a minimum one million dollars.

Manufacturer's Representative; FIO

The individual's name, company name and address, and playground safety training certificate.

Installer's Qualification; FIO

The installer's company name and address, and training and experience certification.

Substitution; FIO

Technical representative's written approval.

Child Safety and Accessibility Evaluation; FIO

Record of measurements and findings by the certified playground safety inspector. Verification that installed protective surfacing meets manufacturer's recommendations and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

SD-10 Operation and Maintenance Data

Maintenance Instruction; FIO

[Two] bound copies of manufacturer's operation and maintenance manuals. The Contractor shall include manufacturer supplied spare parts.

1.5 DELIVERY, STORAGE, AND HANDLING

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery. Protective surfacing material shall be delivered, handled, and stored in accordance with the manufacturer's recommendations. The storage area shall be as designated. The materials shall be stored in a dry, covered area until installed.

1.6 INSPECTION

Protective surfacing material shall be inspected upon arrival at the job site for meeting specified quality. Unacceptable materials shall be removed from the job site.

1.7 MANUFACTURER'S QUALIFICATION

Protective surfacing should have been installed in a minimum 10 sites and been in successful service for a minimum 5 year calendar period. The manufacturer shall provide a Certificate of Insurance AA rated for a minimum one million dollars covering both product and general liability.

1.8 INSTALLER'S QUALIFICATION

The installer shall be certified by the manufacturer for training and experience installing the protective surfacing.

1.9 WARRANTY

Furnished protective surfacing shall have a minimum 1 year calendar period warranty.

1.10 TECHNICAL REPRESENTATIVE

- 1.10.1 [Enter Appropriate Subpart Title Here]
- 1.10.2 Child Development Centers (CDC)

The technical representative for outdoor play areas at CDC shall be the installation Child Development Services (CDS) Coordinator. The design of the CDC outdoor play area shall be based on the developmental play program for the age groups accommodated at the CDC. The play area is designed to support the CDC program and to provide a stage set for creative play. Developmental activities are selected which promote the intellectual, social, emotional and physical growth of the children. The developmental play program is developed by the MACOM CDS Director, installation CDS Coordinator and CDC Director. They are responsible for the developmental play program, child safety and accessibility to meet that program.

1.11 MANUFACTURER'S REPRESENTATIVE

The manufacturer's certified playground safety inspector or the manufacturer's designated certified playground safety representative shall supervise the installation and adjustment of the protective surfacing to verify the installation meets the requirements of the manufacturer, this specification, and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall be the standard products of a manufacturer regularly engaged in the manufacture of protective surfacing and shall be similar to surfacing in satisfactory use a minimum 5 year calendar period. Protective surfacing consists of two systems; synthetic surfacing and loose fill surfacing.

2.2 SYNTHETIC SURFACING

Synthetic surfacing includes the following: poured-in-place system. The synthetic surfacing consists of impact attenuating substrate covered by a wear surface bonded to produce a unified system..

2.2.1 Subbase

The subbase for synthetic surfacing may be either concrete, aggregate, or bituminous material.

2.2.1.1 Concrete Subbase

Concrete material shall conform to Section 02754SECTION 02000 OF THE RFP PACKAGE .

2.2.1.2 Bituminous Subbase

Bituminous material shall conform to Section 02745 SECTION 02000 OF THE RFP PAKAGE.

2.2.1.3 Aggregate Subbase

Aggregate material shall conform to Section 02722SECTION 02000 OF THE RFP PACKAGE .

2.2.2 Impact Attenuating Substrate

The substrate shall be compatible with the wear surface, and shall consist of modular units; poured-in-place; or loose fill. Recycled materials shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

2.2.2.1 Poured-In-Place Substrate

 ${\tt Poured-in-place \ substrate \ shall \ consist \ of \ a \ 100 \ percent \ recycled \ shredded \ styrene \ butadiene \ rubber \ (SBR) \ adhered \ with \ a \ 100 \ percent \ solid \ polyure than e \ binder \ to \ form \ a \ resilient, \ porous \ material \ or \ shredded \ rubber.}$

Strands of SBR may vary from a minimum 0.5 mm to a maximum 2 mm thickness; by a minimum 3 mm to a maximum 20 mm length. Binder shall be between a minimum 12 percent and a maximum 16 percent of the total weight of the mixture of rubber and urethane; and shall provide 100 percent coating of the particles. Foam rubber will not be accepted in the substrate.

2.2.2.2 Loose Fill Substrate

The loose fill substrate shall consist of ¹⁰⁰ percent recycled shredded rubber produced from recycled vehicle tires with non-steel belts. Loose-fill strands may vary from a minimum 3 mm to a maximum 6 mm thickness; a minimum 3 mm to a maximum 13 mm width; and a minimum 13 mm to a maximum 50 mm length.

2.2.3 Wear Surface

Wear surfaces consist of the following: a poured-in-place durable, weather-resistant, ultraviolet stable, water permeable material top-coat. The wear surface shall meet requirements of ASTM D 2047 for a minimum 0.8 coefficient of friction.

2.2.3.1 Poured-in-Place Wear Surface

Poured-in-place wear surface shall consist of ethylene propylene diene monomer (EPDM) particles adhered with a polyurethane binder formulated to produce an even, uniform surface. Particles of EPDM shall meet ASTM D 412 for tensile strength and elongation, and contain a minimum 25 percent of rubber hydrocarbons. Particles of EPDM shall be peroxide or sulfur cured in accordance with the manufacturer. Size of rubber particles shall be between a minimum 1 mm and a maximum 3 mm diameter. Binder shall be between a minimum 16 percent and a maximum 21 percent total weight of rubber used in the wear surface, and shall provide 100 percent coating of the particles. Wear surface shall be a minimum 10 mm thick. The wear surface shall be porous.

2.2.3.2 [Enter Appropriate Subpart Title Here]

- 2.2.3.3 [Enter Appropriate Subpart Title Here]
- 2.2.3.4 [Enter Appropriate Subpart Title Here]
- 2.2.4 [Enter Appropriate Subpart Title Here]
- 2.2.5 Color

The color shall be as shown in Section 09915 COLOR SCHEDULE . An EPDM wear surface is preferred for color retention. Black or the following dark colored SBR wear surfaces retain heat and are not acceptable: color combinations containing more than 10 percent black; or color combinations averaging more than 10 percent dark colors.

2.2.6 [Enter Appropriate Subpart Title Here]

2.2.7 Hardware

Hardware, anchors or fasteners shall be corrosion resistant stainless steel or galvanized steel to anchor the surfacing system securely, in accordance with manufacturer's instructions. Hardware shall provide or be recessed to provide a flat surface and shall be covered by the required depth of protective surfacing.

2.2.8 Binder

Binder for synthetic surfacing shall be nontoxic, weather-resistant, ultraviolet stable, non-hardening, and retaining impact-attenuating performance. It shall be 100 percent solids containing polyurethane, methylene diphenel isocyanate (MDI), or as recommended by the manufacturer. A maximum 2 percent of toluene diphenel isocyanate (TDI) shall be used. Weight of polyurethane shall be between a minimum $1.02~{\rm kg/L}$ and a maximum $1.14~{\rm kg/L}$. Coloring pigments shall be inorganic oxides.

2.2.9 Adhesive

Adhesive shall be a two component polyurethane providing extremely high impact resistant bond and shall be installed as recommended by the manufacturer. The adhesive shall be non-toxic, resistant to ultraviolet light, and safe for children.

2.2.10 Containment Curbs

Containment curbs include the following: treated wood, concrete, recycled plastic, or recycled plastic molded as lumber. Containment curbs shall provide a smooth and hazard-free transition from the protective surfacing to the adjacent surface. Curbs shall be free of sharp vertical edges, protruding elements and trip hazards. Curbs shall be as recommended by the manufacturer. All edges should be provided with a minimum 13 mm radius.

2.2.11 Transition Edge

The transition edge shall be designed to maintain the protective surfacing performance, support the surfacing between changes of material, and shall be concrete in accordance with paragraph CONCRETE CURB. The face of the edge to the subgrade shall be covered with the impact attenuating surface and meet the requirements of paragraph CHILD SAFETY.

2.3 LOOSE-FILL SURFACING

Loose-fill surfacing installed in the use zone shall consist of wood

by-products.

2.3.1 NOT USED

2.3.2 NOT USED

2.3.3 Wood By-Products

Wood by-products include engineered wood fiber. Wood by-products shall be free of sharp or foreign objects or toxic chemicals. Wood by-products manufactured from recycled pallets or lumber containing nails or metal fasteners shall be rejected.

2.3.3.1 NOT USED

2.3.3.2 Engineered Wood Fiber

Engineered wood fiber manufactured for the purpose of protective surfacing shall consist of particles varying from a minimum 3 mm wide to a maximum 13 mm thick; and a minimum 25 mm wide to a maximum 75 mm long.

2.4 GEOTEXTILE FABRIC

Geotextile fabric consists of the following: nonwoven polypropylene sheet; nonwoven 100 percent polyester sheet; or nonwoven needle punched polyester sheet composed of recycled polyester resins.

2.5 RECYCLED PLASTIC

Recycled plastic shall contain a minimum 85 percent of recycled post-consumer product and shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

2.5.1 High Density Polyethylene

The material shall be molded of ultraviolet (UV) and color stabilized polyethylene; and consist of a minimum 75% plastic profile of high-density polyethylene, low-density polyethylene, and polypropylene raw material. The material shall be non-toxic and have no discernible contaminates such as paper, foil, or wood. The material shall contain a maximum 3 percent air voids. The material shall be free of splinters, chips, peels, buckling, and cracks. Material shall be resistant to deformation from solar heat gain. Material shall have factory-drilled holes. Components with extra holes not filled by hardware or covered by other components shall be rejected. The material shall not be painted.

2.5.2 Structural Component

Recycled plastic materials will not be used as load bearing structural members.

2.5.3 Recycled Plastic Molded As Lumber

The component shall deflect a maximum 1/360 of the span of the frame when exposed to a uniform live load of 585 N/m , ASTM D 648. The product shall meet the structural integrity test requirements set forth in ASTM F 1487 and ASTM D 6112.

2.6 CURBS

2.6.1 Concrete Curb

Concrete curbs shall conform to Section 02770SECTION 02000 OF THE RFP ${\tt DOCUMENT}$

PART 3 EXECUTION

3.1 SITE PREPARATION

Prior to installing the protective surfacing, verify the playground equipment and site furnishings are installed in accordance with Section 02882 PLAYGROUND EQUIPMENT, and Section 02870 SITE FURNISHINGS.

3.1.1 Finished Grade and Underground Utilities

The Contractor shall verify that finished grades are as indicated; the smooth grading has been completed in accordance with Section 02300 EARTHWORK; installation of the underground utilities through the area has been completed in accordance with Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS; installation of the storm-drainage system through the area has been completed in accordance with Section 02630 STORM-DRAINAGE SYSTEM. The location of underground utilities and facilities in the area of the operation shall be verified. Damage to underground utilities and facilities shall be repaired at the Contractor's expense.

3.1.2 Layout

The layout of the entire use zone perimeter shall be staked before excavation begins. The location of all elements shall be staked to include the following: All play event configuration access and egress points; and use zone perimeters.

3.1.2.1 Use Zone

The use zone is defined as the area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around equipment; and on whose surface it is predicted that a user would land when falling from or exiting the equipment. Also, the use zone is associated with the following terms; "Clear Area," and "Fall Zone". The use zone shall be free of hard surfaces, objects or obstacles that a child could run into or fall on top of and be injured. Use zone perimeters shall not overlap hard surfaces. The use zone perimeter shall meet or exceed the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS. Use zone perimeters shall not overlap except for certain play events as defined in ASTM F 1487.

3.1.2.2 Shop Drawings

When the use zone perimeter and play event configuration conflict with the requirements and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, shop drawings defining corrective measures shall be submitted to include the following: Adjustment to the play event with the use zone perimeter; use zone perimeter overlaps; fall height and critical height value.

3.1.3 Obstructions Below Ground

When obstructions below ground affect the work, shop drawings showing proposed adjustments shall be provided.

3.1.4 Percolation Test

A test for percolation shall be done to determine positive drainage, to include the lowest elevation of the subgrade in the areas containing the following: sand; gravel; wood by-products; or synthetic surfacing installed over a pervious base. A positive percolation shall consist of a minimum 25 mm per 3 hour period. When a negative percolation test occurs, a shop drawing shall be provided to indicate the corrective measures.

3.1.5 Substitution

Under no circumstances are substitutions to be allowed or protective surfacing to be selected without written approval from the technical representative. Evaluate manufacturer substitutions for the critical height value with meeting the site conditions and paragraph FALL HEIGHT.

3.1.6 Subgrade

Subgrade irregularities shall be corrected to ensure the required depth of protective surfacing is provided. The subgrade elevation shall be as required by the manufacturer.

3.1.7 Subsurface

The subsurface shall be installed in a true, even plane, and sloped to provide positive drainage as indicated.

3.1.8 Subbase

Tolerance of the concrete or bituminous subbase shall be within a maximum 6 mm in 3 m . Tolerance of aggregate subbase shall be within a maximum similar to 6 mm in 3 m .. Aggregate subbase shall be compacted to a maximum 95 percent, ASTM D 1557. The compaction shall be completed in accordance with Section 02300 EARTHWORK. Sand, gravel, and wood products shall not be installed over a concrete, aggregate, or bituminous subbase, per paragraph CHILD SAFETY.

3.1.9 Concrete or Bituminous Curing

Bituminous or concrete subbase shall be cured [a minimum of 7 days] [in accordance with the manufacturer's requirements]. Curing compounds and other deleterious substances that adversely affect adhesion shall be removed. Surface shall be clean and dry.

3.1.10 Fall Height

3.1.10.1 General Requirements

The fall height is defined as the vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it. For some play events the fall height and platform height are the same, while for other play events the fall height and maximum equipment height are the same, Section 02882 PLAYGROUND EQUIPMENT. When the furnished play event fall height varies from the play event shown, shop drawings shall be provided defining the revised depth or type of protective surfacing to meet or exceed the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.1.10.2 Measuring Fall Height

EOUIPMENT MEASURING FALL HEIGHT

Composite Equipment Structure: For a platform surrounded

by protective barriers,
measure from the platform

finished elevation.

For a platform surrounded by guardrails, measure from the guardrail top elevation.

Infant Crawl Area: A maximum 600 mm height,

measured from the crawl wall or barrier finished elevation.

Playhouse, Nonclimbable: Measure from the designated

play surface finished elevation.

Spring Rocking Equipment: Measure from the seat top

elevation.

Stationary Equipment, Climbable: Measure from the maximum

equipment height finished

elevation.

Stationary Equipment, Nonclimbable: Measure from the designated

play surface finished elevation.

Swing: Measure from the bottom of the

pivot point.

3.2 INSTALLING SYNTHETIC SURFACING SYSTEM

Surfacing edges shall fully adhere to the subsurface. Fully cover the subsurface to ensure no hard surfaces are exposed through displacement of loose fill. Rolled or beveled containment curb or transition edges shall maintain the full thickness required to meet paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS. Material shall cover foundation and cutouts around elements penetrating the surface. Seams shall be the minimum necessary and shall be tight.

3.2.1 Temperature Limitation

Temperature limitation for applying adhesive shall be provided.

3.2.2 Poured-in-Place System

Components of the poured-in-place system shall be mixed mechanically on site in accordance with manufacturer's recommendations. Hand-mixing is prohibited. Installation of poured-in-place surfacing shall be seamless and completely bonded to subsurface. Material shall cover foundations and shall be tight around elements penetrating the surface. Add a minimum 2 mm depth to the required surfacing depth to ensure the full depth of material is installed to meet paragraph CHILD SAFETY.

3.2.2.1 Geotextile Fabric for Poured-In-Place

Geotextile fabric shall be installed over a compacted aggregate base as indicated. Fabric shall cover the entire area and shall be lapped a minimum 100 mm width at the seams. Seams shall be adhered in accordance with manufacturer's recommendations. The aggregate base shall be free of ruts or protruding objects. The fabric shall be installed smooth; and free of tensile stresses, folds, and wrinkles. The fabric shall be protected from clogging, tears, or other damage. Damaged fabric shall be repaired or replaced as directed.

3.2.2.2 Poured-in-Place Substrate

The substrate layer of the poured-in-place system shall be installed in one continuous pour on the same day. When a second pour is required, the edge of the previous work shall be fully coated with polyurethane binder to ensure 100 percent bond with new work. Adhesive shall be applied in small quantities so that new substrate can be placed before the adhesive dries.

3.2.2.3 Poured-in-Place Wear Surface

Wear surface shall be bonded to substrate. Adhesive shall be applied to substrate in small quantities so that wear surface can be applied before adhesive dries. Surface shall be hand troweled to a smooth, even finish. When wear surface is composed of different color patterns, pour shall be continuous and seamless. When seams are required due to color change or field conditions, the adjacent wear surface shall be placed as soon as possible, before initial pour has cured. The edge of initial pour shall be coated with adhesive and wear surface mixture shall be immediately applied.

3.3 INSTALLING LOOSE FILL SURFACING SYTEM

3.3.1 Sand Surfacing System

Sand shall be installed over a compacted subgrade at a minimum 450 mm depth throughout the use zone. The finished elevation of sand shall be determined after sand has been settled by saturating with water and percolating. The sand depth in high play activity areas shall be as indicated. Sand shall meet the requirements of paragraph CHILD SAFETY.

3.3.2 Gravel Surfacing System

Gravel shall be installed over a compacted subgrade at a minimum 300 mm depth throughout the use zone. The depth of gravel in high play activity areas shall be as indicated. Gravel shall meet the requirements of paragraph CHILD SAFETY.

3.3.3 Wood By-Product Surfacing System

Engineered wood fiber protective surfacing shall be installed according to manufacturer's instructions. Wood products shall meet the requirements of paragraph CHILD SAFETY.

3.3.3.1 Wood Mulch Surfacing System

Wood mulch shall be installed over a compacted subgrade covered with geotextile fabric. Wood mulch shall meet the requirements of paragraph CHILD SAFETY

3.3.3.2 Engineered Wood Fiber Surfacing System

Engineered wood fiber protective surfacing shall be installed according to manufacturer's instructions. The surfacing shall meet the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.3.3.3 Geotextile Fabric for Wood By-Product

Geotextile fabric shall cover the entire area and shall be lapped a minimum 100 mm width at the seams. Seams shall be adhered in accordance with manufacturer's recommendations. Folds, wrinkles, or loose fabric shall be smoothed. Fabric shall be protected from damage during wood product placement.

3.3.3.4 Minimum Depth for Wood By-Product

Wood by-product shall be installed at a minimum 300 mm depth throughout the use zone. The depth of wood products in high play activity areas shall be as indicated.

3.4 RESTORATION AND CLEAN UP

When the operation has been completed, the Contractor shall clean up and protect the site. Existing areas that have been damaged from the operation shall be restored to original condition at the Contractor's expense.

3.4.1 Clean Up

The site and play events shall be cleaned of all materials associated with the operation. Play events and surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be as recommended by the manufacturer.

3.4.2 Protection

The area shall be protected as required or directed by providing barricades and signage. Signage shall be in accordance with Section 10430 EXTERIOR SIGNAGE

3.4.3 Disposal of Materials

Excess and waste material shall be removed and disposed of off Government property.

3.5 PROTECTIVE SURFACING ACCEPTANCE

3.5.1 Child Safety and Accessibility Evaluation

When the protective surfacing is installed, the play events and protective surfacing shall be thoroughly inspected and measured to verify the playground meets manufacturer's recommendations, paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, and paragraph FALL HEIGHT as follows: 1) secure anchoring; 2) all hardware and connectors are tight and below the wear surface; 3) sharp points, edges, and protrusions; 4) entanglement; and 5) pinch, crush, and shear points. Measure use zone distances to determine the area is free of hard surfaces, objects or obstacles. Determine exceptions to use zone overlaps occur in accordance with ASTM F 1487. Measure play event fall height and compare to critical height value for the thickness of installed synthetic surfacing. Measure play event fall height and depth of loose fill protective surfacing. Ensure installed chopped tire material is free from steel belts. Ensure the slide exit region has

the required clear zone. Swing seat clearances are measured while occupied by a maximum user for the age group using the equipment. The finished installation shall have the appearance of a single covering. Protective surfacing that does not comply shall be reinstalled. Hardware that does not comply shall be replaced. Ensure positive drainage for the area and the lowest elevation of protective surfacing subgrade has been provided. A written report describing the results of the evaluation shall be provided.

3.5.2 Spare Parts

Protective surfacing spare parts provided by the manufacturer shall be furnished.

3.5.3 Maintenance Instruction

The manufacturer's operation and maintenance manual describing the recommended preventive maintenance, inspection frequency and techniques, periodic adjustments, lubricants, and cleaning requirements shall be furnished.

3.6 RE-INSTALLATION

When re-installation is required, the following shall be accomplished. Re-install the product as specified. Provide new replacement materials supplied by the manufacturer (material acquisition of replacement parts is the responsibility of the Contractor). Damage caused by the failed installation shall be repaired at the Contractor's expense.

-- End of Section --

SECTION 02882

PLAYGROUND EQUIPMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123/A 123M	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 135	(1997c) Electric-Resistance-Welded Steel Pipe
ASTM A 153/A 153M	(2000) $_{ m Zinc}$ Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 513	(2000) Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
ASTM B 26/B 26M	(1999) Aluminum Alloy Sand Castings
ASTM B 108	(1999) Aluminum-Alloy Permanent Mold Castings
ASTM B 117	(1997) Operating Salt Spray (Fog) Apparatus
ASTM B 179	(1996) Aluminum Alloys in Ingot and Molten Forms for Castings from All Casting Processes
ASTM B 221M	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM D 648	(2000) Deflection Temperature of Plastics Under Flexural Load
ASTM D 822	(1996) Conducting Tests on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Exposure Apparatus
ASTM D 1248	(2000) Polyethylene Plastics Molding and

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Extrusion	Materials

ASTM D 1735	(1999) Testing Water Resistance of Coatings Using Water Fog Apparatus
ASTM D 2454	(1995) Determining the Effect of Overbaking on Organic Coatings
ASTM D 2794	(1993; R 1999el) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	(1997) Measuring Adhesion by Tape Test
ASTM D 3363	(2000) Film Hardness by Pencil Test
ASTM D 6112	(1997) Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes
ASTM F 1487	(1998) Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

CPSC Pub No 325	(1994)	Handbook	for	Public	Playground
	Safety				

1.2 DEFINITIONS

Age-Appropriate: A term that describes equipment scale to include platform height, fall height and maximum equipment height, that allows safe and successful use by children of a specific chronological age; mental and physical ability; and anthropometric measurement. Maximum equipment height and complexity will not exceed a child's ability in that age group.

Composite Structure: Also "Composite Play Structure; Linked Structure". Two or more play events attached, directly adjacent or functionally linked, to create one integral unit that provides more than one play activity.

Designated Play Surface: Any elevated surface for standing, walking, sitting, or climbing; or a flat surface a minimum 50 mm wide having up to a maximum 30 degree angle from horizontal. In some play events the platform surface will be the same as the designated play surface. However, the terms should not be interchanged as they do not define the same point of measurement per ASTM F 1487.

Maximum Equipment Height: The highest point on the equipment (i.e., roof ridge, top of support pole).

Play Event: A piece of manufactured playground equipment that supports one or more play activities.

Protective Surfacing: Material to be used within the use zone that meets the fall attenuation requirements of Section 02791 PLAYGROUND PROTECTIVE SURFACING.

Suspended Hazard: Cable, wire, rope or similar devices suspended up to a maximum 2100 mm high between play events; or installed up to a maximum 45

degree angle from the ground to the play event.

1.3 CHILD SAFETY AND ACCESSIBILITY STANDARDS

1.3.1 Child Safety

Play events shall meet the child safety performance requirements described in CPSC Pub No 325 and ASTM F 1487. The requirements include the following: Head and neck entrapment; sharp points, edges, and protrusions; entanglement; pinch, crush, and shear points; suspended hazards; play event access and egress points; play event use zone perimeter; and design criteria. Since ASTM F 1487 criteria is defined for the minimum user through the maximum user (6 through 10 years of age).

1.3.2 Child Accessibility

The accessibility requirement in accordance with ASTM F 1487 includes the following: When the play event use zone consists of a protective surfacing rated as unaccessible, at least one accessible route shall be provided from the use zone perimeter to the play event. When there is more than one of the same play activity provided, only one shall meet accessibility requirements. When the access and egress points are not the same for a play event, an accessible route shall be provided to both. The accessible route shall access all accessible play events and elements. The protective surfacing performance requirements shall be in accordance with Section 02791 PLAYGROUND PROTECTIVE SURFACING.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Configuration; [GA]

Scale drawings defining the revised play event configuration.

Shop Drawings; GA]

Scale drawings defining the revised use zone perimeters and play event layout.

Fall Height; [FIO]

Scale drawings defining the revised depth or type of protective surfacing.

Finished Grade and Underground Utilities; [FIO]

Finished grade, underground utilities, storm-drainage system and irrigation system status; and location of underground utilities and facilities.

SD-03 Product Data

Equipment; [FIO]

Manufacturer's descriptive data; catalog cuts; references; and the latest edition of ASTM F 1487 and CPSC Pub No 325.

Manufacturer's specifications, handling and storage requirements, installation procedures, and safety data sheets to include the following: bare or painted metal platform and slide bed orientation from the direct sun; warnings; and child safety performance standards.

Equipment Identification; FIO]

A list to include part numbers of furnished play event and equipment materials and components.

Delivery, Storage and Handling; FIO

Delivery schedule and manufacturer's name.

Manufacturer Qualification; FIO]

Name of the owner or user; service or preventive maintenance provider; date of the installation; point of contact and telephone number; and address for 10 sites.

Spare Parts; FIO

Furnish manufacturer supplied spare parts.

Materials; FIO

Assembled play event structural integrity tests; vertical load tests; and the maximum number of users that can be on the play event.

SD-04 Samples

Color; [GA]

Two color charts displaying the colors and finishes.

SD-06 Test Reports

Recycled Plastic; FIO

Individual component and assembled unit structural integrity test; creep tolerance; deflection tolerance; and vertical load test results. The estimated percentage of recovered material content in the material and components. Life-cycle durability.

SD-07 Certificates

Materials; FIO

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include composition and tests to which the material has been subjected.

Manufacturer Qualification; FIO

Certificate of Insurance AA rated for a minimum one million dollars.

Installer Qualification; FIO

The installer's company name and address, and training and experience certification.

Manufacturer's Representative; FIO

The individual's name, company name and address, and playground safety training certificate.

Substitution; FIO]

Technical representative's written approval.

Play Event Modification; GA

Manufacturer's written approval.

Child Safety and Accessibility Evaluation; FIO

Record of measurements and findings by the certified playground safety inspector. Verification the installed play events and equipment meet manufacturer's recommendations and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

SD-10 Operation and Maintenance Data

Maintenance Instruction; FIO]

[Two] bound copies of the manufacturer's operation and maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery. Equipment shall be delivered, handled, and stored in accordance with the manufacturer's recommendations. The storage area shall be as designated. The materials shall be stored in a dry, covered area until installed.

1.6 EQUIPMENT IDENTIFICATION

Playground equipment shall be identified with attached and durable label stating the age-group that the equipment is designed to accommodate. There shall be permanent WARNING labels and manufacturer's identification labels, ASTM F 1487.

1.7 INSPECTION

Playground equipment shall be inspected upon arrival at the job site for meeting age-appropriate requirements for the age-group that the equipment is designated to accommodate and specified quality in accordance with paragraphs MATERIALS and CONFIGURATION. Prohibited or unacceptable equipment shall be removed from the job site.

1.8 PROHIBITED EQUIPMENT

Equipment that does not meet the Army's developmental play program requirements and are prohibited on outdoor play areas include the following: chain balance beams; rotating equipment, such as merry-go-rounds, log rolls, whirls and may poles; fulcrum seesaws (teeter totters); spring rocking equipment intended for standing; rope swings; multiple occupancy swings; swinging exercise and trapeze bars; swinging platforms; tire climbers; swinging dual exercise rings; roller slides; trampolines; swinging gates or doors; and new or used vehicle tires. Play houses or enclosures made of horizontal posts or bars with space between them. Wood components treated with creosote, pentachlorophenol, and tributyl tin oxide. Wood components coated with a finish containing pesticide.

1.9 AGE GROUPS

Play areas are designed to provide challenging play activities by age group. Playground equipment shall be designed to be age appropriate for the age group designated to use it. There is no anthropometric or fall attenuation significance to the discrepancy for the school-age age group between paragraph PLAYGROUND AREAS OTHER THAN CHILD DEVELOPMENT CENTERS and paragraph CHILD DEVELOPMENT CENTERS as described below. The Army age groups are defined as follows:

1.9.1 Playground Areas Other Than Child Development Centers (CDC)

The age groups accommodated at these areas range from 6 through 10 years of age defined as the following: school-age age group (6 through 10 years of age).

1.10 MANUFACTURER QUALIFICATION

Play events and equipment similar to those furnished shall have been installed in a minimum 10 sites and been in successful service for a minimum 5 year calendar period. The manufacturer shall provide a Certificate of Insurance AA rated for a minimum one million dollars covering both product and general liability.

1.11 INSTALLER QUALIFICATION

The installer shall be certified by the manufacturer for training and experience installing the play events and equipment.

1.12 WARRANTY

Furnished play events and equipment shall have a minimum 1 year calendar period warranty.

1.13 TECHNICAL REPRESENTATIVE

1.13.1 Child Development Centers (CDC)

The technical representative for outdoor play areas at CDC is the installation Child Development Services (CDS) Coordinator. The design of the CDC outdoor play area shall be based on the developmental play program for the age groups accommodated at the CDC. The play area is designed to support the CDC program and to provide a stage set for creative play.

Developmental activities are selected which promote the intellectual, social, emotional and physical growth of the children. The developmental play program is developed by the MACOM CDS Director, installation CDS Coordinator and CDC Director. They are responsible for the developmental play program and the selection of play events to meet that program.

1.14 MANUFACTURER'S REPRESENTATIVE

The manufacturer's certified playground safety inspector or the manufacturer's designated certified playground safety representative shall supervise the installation and adjustment of the play events and equipment to verify the installation meets the requirements of the manufacturer, this specification, and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall be the standard products of a manufacturer regularly engaged in the manufacture of play event products.

2.1.1 Metal

Metal components shall have factory-drilled holes and be corrosion resistant. The components shall be free of excess weld and spatter. Metallic materials shall conform to Section 05500 MISCELLANEOUS METAL. Components with extra holes not filled by hardware or covered by components shall be rejected.

2.1.1.1 Steel

Steel components shall comply with ASTM A 135, ASTM A 500, or ASTM A 513. Minimum tensile strength shall be 310 Mpa $\,$. Minimum yield point shall be 225 Mpa.

2.1.1.2 Aluminum

Extruded aluminum components shall be type 6061-T6, 6062-T6, or 6063-T6, and shall conform to ASTM B 221M . Minimum tensile strength of extruded aluminum components shall be 270 Mpa $\,$, and the minimum yield shall be 250 Mpa $\,$. Cast aluminum alloy shall conform to ASTM B 179, ASTM B 26/B 26M, and ASTM B 108.

2.1.1.3 Chain

Chain shall be a minimum size 4/0 and shall be corrosion resistant zinc plated. Polyvinyl chloride coating shall be as specified.

2.1.1.4 Rope Cable

Rope cable shall be composed of strands of steel cable with a polypropylene or Dacron synthetic covering that is UV stabilized. Cable ends shall be capped to prevent fraying.

2.1.1.5 Hardware

Hardware shall be corrosion resistant and consist of the following: aluminum, stainless steel, brass, zinc plated steel, zinc-chromate plated steel, or galvanized steel, ASTM A 153/A 153M. When secure the hardware

shall require a tool to prevent unauthorized loosening and removal.

2.1.1.6 Rails, Loops, and Hand bars

Rails, loops, and hand bars shall consist of corrosion resistant aluminum, powder-coated steel or galvanized steel. Polyvinyl chloride coating, if provided, shall be as specified.

2.1.1.7 Anchors

Anchors shall be in accordance with manufacturer's recommendations.

2.1.2 Plastic Components

2.1.2.1 Panels

Plastic panels shall be molded of ultraviolet (UV) and color stabilized polyethylene or nylon with a minimum 5 mm thickness, ASTM F 1487. Edges shall be a minimum 5 mm radius.

2.1.2.2 WindowSub

Plastic windows shall be flat or molded into a bubble shape, and consist of clear polycarbonate plastic a minimum 5 mm thick before forming in accordance with ASTM D 1248. Material shall be shatterproof and resistant to crazing, cracking, or fogging.

2.1.3 Recycled Plastic

Recycled plastic shall contain a minimum 85 percent of recycled post-consumer product and shall conform to EPA requirements in accordance with Section 01670 RECYCLED/RECOVERED MATERIALS. Recycled material shall be constructed or manufactured with a maximum 6 mm deflection or creep in any member, ASTM D 648 and ASTM D 6112.

2.1.3.1 High Density Polyethylene

The components shall be molded of ultraviolet (UV) and color stabilized polyethylene. The material shall consist of a minimum 75% plastic profile of high-density polyethylene, low-density polyethylene, and polypropylene raw material. The material shall be non-toxic and have no discernible contaminates such as paper, foil, or wood. The material shall contain a maximum 3 percent air voids. The material shall be free of splinters, chips, peels, buckling, and cracks. Material shall be resistant to deformation from solar heat gain. Material shall have factory-drilled holes. Components with extra holes not filled by hardware or covered by other components shall be rejected. The material shall not be painted.

2.1.3.2 Panel

Panels shall be a minimum 6 mm thick; exposed edges shall be smoothed, rounded, and free of burrs and points; and the material shall be shatterproof and resistant to fading, cracking, or fogging.

2.1.3.3 Structural Component

Recycled plastic materials will not be used as load bearing structural members.

2.1.3.4 Recycled Plastic Molded As Lumber

For deck or platform construction, the span of the structural support members shall be a maximum 300 mm on center and recycled plastic decking shall connect to a minimum three joists. Material used for decking shall have a non-slip texture surface. The assembly shall deflect a maximum 1/360 of the span of the frame when exposed to a uniform live load of 585 N/m , ASTM D 648. The product shall meet the structural integrity test requirements, ASTM F 1487 and ASTM D 6112.

2.1.4 Coatings

2.1.4 Galvanized

Metal components shall be hot-dipped in zinc after fabrication according to ASTM A 123/A 123M. Tailings and sharp protrusions formed as a result of the hot-dip process shall be removed and edges shall be burnished.

2.1.4.2 Polyester Powder

Powder-coated surfaces shall receive electrostatic zinc coating prior to painting. Powder coating shall be electrostatically applied and shall be oven cured. Polyester powder shall be in accordance with the following: ASTM D 3359 for adhesion; ASTM D 1735 for flexibility; ASTM D 3363 for hardness; ASTM D 2794 for impact; ASTM D 2454 for overbake resistance; ASTM B 117 for salt spray resistance; and ASTM D 822 for weatherability.

2.1.4.3 Polyvinyl Chloride (PVC)

PVC coating shall be primed with a clear acrylic thermosetting solution. The primed parts shall be preheated prior to dipping. The liquid polyvinyl chloride shall be UV stabilized and mold-resistant. The coated parts shall be cured. The coating shall be a minimum 2 mm thick within a plus or minus 0.5 mm tolerance. The coating shall have an 85 durometer hardness, ASTM D 3363. The finish shall be slip-resistant.

2.1.4.4 Concrete

Concrete shall conform to Section SECTION 02000 OF THE RFP DOCUMENT.

2.1.5 Cast-In Place Concrete

Cast-in-place concrete material shall conform to Section 03330 CAST-IN-PLACE ARCHITECTURAL CONCRETE.

2.1.6 Wood Sealants

Exposed wood surfaces shall have factory applied prime coat with a minimum 2 spray coats of two-component polyurethane or approved preservative that meets paragraph WOOD TREATMENT.

2.1.6.1 Paint

Paint shall be factory applied to a minimum 2 coats. Paint shall comply with Section 09900 PAINTING, GENERAL and be weather resistant, cracking, peeling and fading.

2.1.6.2 Sealants

Sealants shall seal all applied surfaces from air. Sealants containing

pesticide are prohibited.

2.1.7 Color

Color shall be provided in accordance with Section 09915 COLOR SCHEDULE.

2.2 EQUIPMENT

2.2.1 Configuration

Play event configuration, platform height, fall height, and maximum equipment height shall be in accordance with the requirements of CPSC (Consumer Produce Safety Commission) Publication No. 325 and ASTM F 1487. When the configuration varies from the play event shown, shop drawings defining the configuration shall be provided to include the following: equipment layout with the use zone perimeter; designated play surface spot elevations; maximum equipment height spot elevations; platform spot elevations; protective barriers; guardrails; bare or painted metal platform and slide bed orientation; and play events in relationship to the playground layout.

2.2.2 Substitution

Substitutions will not be allowed and play events will not be selected without written approval from the technical representative. Manufacturer substitutions which increase the play event platform height or maximum equipment height shall be evaluated. The increased height requires additional protective surfacing in accordance with paragraph FALL HEIGHT.

2.2.3 Platform Height

Platform height is used to define the age group for age appropriate play events and composite structures. To be age appropriate, the platform height shall meet the finished elevations of the age groups in the following paragraphs. For some play events platform height and paragraph FALL HEIGHT are the same.

2.2.3.1 [Enter Appropriate Subpart Title Here]2.2.3.2 [Enter Appropriate Subpart Title Here]2.2.3.3 [Enter Appropriate Subpart Title Here]2.2.3.4 School-Age Age Group

Platforms designed for children 6 through 10 years of age shall have a finished elevation a maximum 1800 mm above the finished elevation of the protective surfacing.

2.2.4 Protective Barrier and Guardrail

Protective barriers and guardrails shall be provided in accordance with paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

2.2.4.1 Protective Barrier

A protective barrier is defined as an enclosing device around an elevated surface that prevents both inadvertent and deliberate attempts to pass through the device. The protective barrier for school-age groups shall be provided on elevated surfaces a minimum 1200 mm above the protective surfacing. The protective barrier shall completely surround the elevated surface except for the access or egress route. As infants are not to be placed on an elevated surface, the protective barrier for the infant age

group shall be the same as the crawl wall defined in paragraph MEASURING FALL HEIGHT.

2.2.4.2 Guardrail

A guardrail is defined as a device around an elevated surface that prevents inadvertent falls from the elevated surface. The guardrail for school-age shall be provided on elevated surfaces a minimum 760 mm above the protective surfacing. The guardrail shall completely surround the elevated surface except for the access or egress route.

2.2.5 [Enter Appropriate Subpart Title Here]2.2.6 [Enter Appropriate Subpart Title Here]2.2.7 Single-Axis (To-Fro) Swing

2.2.7.1 General Requirements

The swing seat shall be molded of high quality rubber or polyurethane with an encapsulated steel reinforcement. The swing seat shall be designed to accommodate one user2.2.7.2 [Enter Appropriate Subpart Title Here]

2.2.8 Roofs

Roofs shall contain no designated play surface.

2.2.9 Sliding Poles

Sliding poles shall be a maximum 48 mm diameter and a continuous surface with no protruding welds or joints along the sliding area.

2.2.10 Plastic Slide

The slide shall be molded of UV stabilized polyethylene or nylon with minimum of 5 mm wall thickness. The edge shall be a minimum 5 mm radius, ASTM D 1248, Type II, Class A, Grade G4.

2.2.11 [Enter Appropriate Subpart Title Here]

PART 3 EXECUTION

3.1 SITE PREPARATION

3.1.1 Finished Grade and Underground Utilities

The Contractor shall verify that finished grades are as indicated; the smooth grading has been completed in accordance with Section 02300 EARTHWORK; installation of the underground utilities through the area has been completed in accordance with Section 02316 EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES SYSTEMS; installation of the storm-drainage system through the area has been completed in accordance with Section 02630 STORM-DRAINAGE SYSTEM. The location of underground utilities and facilities in the area of the operation shall be verified. Damage to underground utilities and facilities shall be repaired at the Contractor's expense.

3.1.2 Layout

The layout of the entire outdoor play area shall be staked before excavation begins to include the following: all play event configuration access and egress points; use zone perimeters; hard surface areas and

pathway widths; exterior plant material and planters; walls and fences; and structures. Sufficient space shall be provided between all adjacent play events and individual play events for play activities and circulation. Moving and rotating play events shall be located away from circulation to prevent collisions.

3.1.2.1 Use Zone

The use zone is defined as the area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around equipment; and on whose surface it is predicted that a user would land when falling from or exiting the equipment, (paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS). Also, the use zone is associated with the following terms; "Clear Area," and "Fall Zone". The use zone shall be free of hard surfaces, objects or obstacles that a child could run into or fall on top of and be injured. The use zone shall consist of protective surfacing in accordance with the requirements of Section 02791 PLAYGROUND PROTECTIVE SURFACING. Use zone perimeters shall not overlap hard surfaces. The use zone perimeter shall meet or exceed the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS. Use zone perimeters shall not overlap except for certain play events as defined in ASTM F 1487.

3.1.2.2 Shop Drawings

When the use zone perimeter and play event configuration conflict with the requirements and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, shop drawings defining corrective measures shall be submitted to include the following: Adjustment to the play event with the use zone perimeter; use zone perimeter overlaps; hard surface area and pathway widths; structures; exterior plant material and planters; walls and fences; and bare or painted metal platform and slide bed orientation to the direct sun.

3.1.3 Orientation

Bare or painted metal platforms and slide beds shall be oriented from the direct sun; or shaded to reduce contact burn risk. Play events that require orientation to adjacent play events or to meet visibility requirements shall be properly oriented.

3.1.4 Obstructions Below Ground

When obstructions below ground affect the work, shop drawings showing proposed adjustments shall be submitted for approval.

3.2 INSTALLATION

Play events shall be installed according to the manufacturer's recommendations and as shown to meet the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.2.1 Play Event Modification

Site modifications of play events affect the coverage provided in paragraph WARRANTY; therefore, play events and equipment shall not be modified without the written approval of the manufacturer.

3.2.2 Plastic Play Events

Plastic and recycled plastic components shall be connected by stainless

steel hardware. The hardware shall be countersunk. Recycled plastic molded as lumber or wood-polymer lumber shall be installed in accordance with the manufacturer's recommendations.

3.2.3 Footings

The top elevation of play event footings will be installed at the subbase of the protective surfacing.

3.2.4 [Enter Appropriate Subpart Title Here]

3.2.5 Single-Axis (To-Fro) Swing

The single-axis (to-fro) swing shall be located on the perimeter of the outdoor play area. It shall not be attached to a composite structure.

3.2.6 Slide

The required exit region clear area shall be provided in accordance with ASTM F 1487.

3.2.7 Chain or Rope Ladder, Climber or Net Climber

A chain or rope ladder; climber; net climber; and similar components shall be installed in the vertical position. Angled or arch positions are not accepted.

3.2.8 Composite Structure

The composite structure use zone perimeter shall be composed of the use zone perimeters of the play events that, when joined together, comprise the composite structure.

3.2.9 Fall Height

3.2.9.1 General

The fall height is defined as the vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it. For some play events the fall height and paragraph PLATFORM HEIGHT are the same. For some play events the fall height and maximum equipment height are the same. When the furnished play event fall height varies from the play event shown, shop drawings defining the revised depth or type of protective surfacing to meet or exceed the requirements of Section 02791 PLAYGROUND PROTECTIVE SURFACING shall be provided.

3.2.9.2 Measuring Fall Height

EQUIPMENT

MEASURING FALL HEIGHT

Composite Structure:

For a platform surrounded by protective barriers, measure from the platform finished elevation.

For a platform surrounded by guardrails, measure from the guardrail top elevation. EQUIPMENT MEASURING FALL HEIGHT

Stationary Equipment, Climbable: Measure from the maximum

equipment height finished

elevation.

Stationary Equipment, Nonclimbable: Measure from the designated

play surface finished elevation.

Swing: Measure from the bottom of the

pivot point.

3.2.10 SIGNAGE

For playground areas other than CDC, durable permanent signage shall be provided to identify the age group the equipment is designed to accommodate. Signage shall be in accordance with Section 10430 EXTERIOR SIGNAGE.

3.3 RESTORATION AND CLEAN UP

When the operation has been completed, the Contractor shall clean up and protect the site. Existing areas that have been damaged from the operation shall be restored to original condition at the Contractor's expense.

3.3.1 Clean Up

The site and play events shall be cleaned of all materials associated with the operation. Play events and surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be as recommended by the manufacturer. Required labeling shall be undamaged and visible in accordance with paragraph EQUIPMENT IDENTIFICATION.

3.3.2 Protection

The area shall be protected as required or directed by providing barricades and signage. Signage shall be in accordance with Section 10430 EXTERIOR SIGNAGE.

3.3.3 Disposal of Materials

Excess and waste material shall be removed and disposed off Government property.

3.4 PLAYGROUND ACCEPTANCE

3.4.1 Child Safety and Accessibility Evaluation

When the protective surfacing is installed the play events and protective surfacing shall be thoroughly inspected and measured to verify the playground meets manufacturer's recommendations, paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, and paragraph FALL HEIGHT. The play events shall be age appropriate for the age group using them in accordance with paragraph PLATFORM HEIGHT. Determine 1) secure anchoring; 2) all hardware and connectors are tight; 3) all hardware and connectors require tools to loosen; 4) all hooks are closed; 5) head and neck entrapment; 6) sharp points, edges, and protrusions; 7) entanglement; 8) pinch, crush, and shear points; 9) suspended hazards; 10) all component holes are filled; and 11)

recycled plastic components used as load bearing structural members. Use zone distances shall be measured to determine the area is free of hard surfaces, objects or obstacles. Determine exceptions to use zone overlaps occur in accordance with paragraph USE ZONE. Play event fall height shall be measured and compared to critical height value for thickness of installed protective surfacing. The slide exit region shall have the required clear zone. Play events and surfaces shall be properly oriented. Chain, rope, net climbers or similar components shall be installed in a vertical position. Swing seat clearances shall be measured while occupied by a maximum user for the age group using the equipment. Warning labels and manufacturer identification labels shall be visible in accordance with paragraph EQUIPMENT IDENTIFICATION. Play events that do not comply shall be reinstalled. Fasteners, anchors, hardware and labels that do not comply shall be replaced. Ensure positive drainage for the area and the lowest elevation of protective surfacing subgrade has been provided. A written report describing the results of the evaluation shall be provided.

3.4.2 Spare Parts

Play event and equipment spare parts provided by the manufacturer shall be furnished.

3.4.3 Maintenance Instruction

The manufacturer's operation and maintenance manual describing the recommended preventive maintenance, inspection frequency and techniques, periodic adjustments, lubricants, and cleaning requirements shall be furnished.

3.5 RE-INSTALLATION

When re-installation is required, accomplish the following: Re-install the product as specified. Provide new replacement materials supplied by the manufacturer. Material acquisition of replacement parts is the responsibility of the Contractor. Damage caused by the failed installation shall be repaired at the Contractor's expense. Upon completion of the re-installation a safety inspector shall certify the re-installation.

DIVISION 3 – CONCRETE

03000: Outline Specifications

SECTION 03000

DIVISION 3: CONCRETE - OUTLINE SPECIFICATIONS

PART 1 GENERAL

- 1.1 GENERAL REQUIREMENTS
- 1.1.1 Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 3: CONCRETE. All requirements contained in section 01015 (Sturctural) of the RFP document must be incorporated into the edited specifications.

Section 03100A, STRUCTURAL CONCRETE FORMWORK

Section 03150A, EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS

Section 03200A, CONCRETE REINFORCEMENT

Section 03300A, CAST-IN-PLACE STRUCTURAL CONCRETE (FOR BUILDING CONSTRUCTION)

- 1.2 SECTION 03200, CONCRETE REINFORCEMENT
- 1.2.1 Reinforcing Steel

Reinforcing Steel: ASTM A615M Grade 420 (60 ksi) Steel

- 1.2.2 Welded Wire Fabric: ASTM A185
- 1.2.3 Weldable Reinforcing Steel

Weldable Reinforcing Steel: ASTM A706M Grade 420 (60 ksi) Steel

- 1.3 SECTION 03300A, CAST-IN-PLACE STRUCTURAL CONCRETE
- 1.3.1 Concrete for building and exterior slabs

The required 28-day compressive strength of the concrete shall be left to the Design/Build Contractor's discretion, except that 27.6 MPa (4000 psi) shall be a minimum. Require a maximum limit on water/cementitious ratio = 0.44 by weight. Concrete shall have a total air content of 6 +/- 1.5 percent. Limit maximum size aggregate to ¾ inch. Aggregate shall conform to ASTM C 33, Class 5S. Concrete shall be tested for durability during mix design. Test concrete aggregates for alkali reactivity of aggregates (ASR) in accordance with ASTM C 1260 and shall have an expansion of less than 0.1 percent at 16 days. Test concrete for freeze-thaw durability in accordance with CRD-C 114, or ASTM C 666 Procedure A, concrete shall have a Durability Factor greater than 50. Concrete mix designs shall be proportioned to use the maximum permitted air content. Immediately following placement, all concrete shall be continuously cured by approved methods for at least 14 days.

DIVISION 4 - MASONRY

04000: Outline Specifications

SECTION 04000

DIVISION 4: MASONRY - OUTLINE SPECIFICATIONS

PART 1 GENERAL

- 1.1 GENERAL REQUIREMENTS
- 1.1.1 Contractor Edited Guide Specifications

Depending upon the structural system used, The contractor shall edit and provide the following UFGS guide specifications for Division 4: MASONRY. All requirements contained in section 01015 (Sturctural) of the RFP document must be incorporated into the edited specifications.

Section 04200A, MASONRY Section 04220A, NONBEARING MASONRY VENEER/STEEL STUD WALLS

- 1.2 SECTION 04200A, MASONRY
- 1.2.1 Reinforcing Steel

Reinforcing Steel: ASTM A615M Grade 420 (60 ksi) Steel

- 1.2.2 Joint Reinforcement shall be horizontal ladder type(minimum 9 gauge)
- 1.2.3 Hollow and solid concrete masonry units shall conform to ASTM C 90, Type I. Minimum f'm = 9.4 Mpa (1350 psi)
- 1.2.4 Grout

Minimum Grout strength shall be 13.8 Mpa (2000 spi).

- 1.2.5 Motar
 - Type S. Minimum motar strength shall be 12.4 Mpa (1800psi)
- 1.2.6 Masonry shall be laidup in running bond pattern.

DIVISION 5 - METALS

05000: Outline Specifications

SECTION 05000

DIVISION 5: METALS - OUTLINE SPECIFICATIONS

PART 1 GENERAL

- 1.1 GENERAL REQUIREMENTS
- 1.1.1 Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 5: METALS. All requirements contained in section 01015 (Sturctural) of the RFP document must be incorporated into the edited specifications.

Section 05090A, WELDING STRUCTURAL Section 05120A, STRUCTURAL STEEL Section 05210A, STEEL JOISTS Section 05300A, STEEL DECKING Section 05500A, MISCELLANEOUS METAL

- 1.2 SECTION 05090A, WELDING, STRUCTURAL
- 1.3.1 Welds: Welding shall be in accordance with AWS, E70XX.
- 1.2.1 All steel exposed to the weather shall be hot dipped galvanized.
- 1.3 SECTION 05120A, STRUCTURAL STEEL
- 1.3.1 Structural Steel, Shapes, Plates and Bars: ASTM A36M (minimum)
- 1.3.2 Structural Tubing: ASTM A500, Grade B
- 1.3.3 Steel Pipe: ASTM A53 Type S Grade B
- 1.3.4 High Strength Bolts: ASTM A325M
- 1.3.5 Anchor Bolts: ASTM A307

DIVISION 6 - WOOD AND PLASTICS

06000: Outline Specifications

Government-Edited Guide Specifications:

06410a Laminate Clad Architectural Casework

SECTION 06000

DIVISION 6: WOOD AND PLASTICS - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 6: WOOD AND PLASTICS:

Section 06100A, ROUGH CARPENTRY

Section 06200A, FINISH CARPENTRY

Section 06650, SOLID POLYMER FABRICATIONS

1.1.2 Government Edited Specifications

The contractor shall incorporate the following government-supplied, fully edited specification sections as part of the project design:

Section 06410A, LAMINATE-CLAD ARCHITECTURAL CASEWORK

1.2 SECTION 06100A, ROUGH CARPENTRY

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. All wood blocking shall be No. 2 Grade, stud grade or better.
- 1.3 SECTION 06200A, FINISH CARPENTRY

1.3.1 Material Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. All exposed interior wood trim and chair rails shall be rift cut, red oak and shall receive stain and a clear finish.
- B. Specific criteria and specifications shall be provided for all wood running trim, chair rails, utility shelving and other finished wood items or components shown on the drawings.
- C. Stain and finish combination for all finished wood items shall match Wilsonart plastic laminate #7816 Solar Oak. Finish shall be polyurethane.

1.4 SECTION 06650, SOLID POLYMER FABRICATIONS

1.4.1 Material Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria for solid polymer material:

- A. All horizontal applications of solid polymer, solid surfacing material shall be 13 mm thickness. Vertical application as wall cladding shall be 6 mm in thickness.
- B. All solid polymer, solid surfacing material shall be 100 percent acrylic. Blends or reinforced compositions are prohibited.

1.4.2 Fabrication Criteria

The contractor edited specification section shall include the following fabrication criteria:

- A. Solid surfacing countertops, window stools, and partition caps shall utilize a 25 mm solid surfacing bullnose profile at all exposed edges.
- B. Solid surfacing countertops shall include a 100 mm high coved backsplash and matching loose side splashes. Coved backsplash shall be fabricated using the V-Groove method as a cost savings measure. Top edge of splashes shall be chamfered or radiused.
- C. Clear silicone sealant shall be applied at the juncture of all walls and solid surfacing material.

SECTION 06410A

LAMINATE CLAD ARCHITECTURAL CASEWORK

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ARCHTECTURAL WOODWORK INSTITUTE (AWI)

AWI Qual Stds (1999) Architectural Woodwork Quality

Standards.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3 (1995) High Pressure Decorative Laminates

NEMA LD 3.1 (1995) Performance, Application, Fabrication, and Installation of High

Pressure Decorative Laminates

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

ANSI A161.2 (1998) Decorative Laminate Countertops,
Performance Standards for Fabricated High

Description

Pressure

ANSI A208.1 (1999) Particleboard Mat Formed Woods

ANSI A208.2 (1994) Medium Density Fiberboard (MDF)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1037 (1999) Evaluating Properties of Wood-Base

Fiber and Particle Panel Materials

ASTM F 547 (1977; R 1995) Definition of Terms

Relating to Nails for Use with Wood and

Wood-Based Materials.

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA A156.9 (1994) Cabinet Hardware

NSF INTERNATIONAL (NSF)

NSF 2 (1996) Food Equipment

NATIONAL WOOD WINDOW & DOOR ASSOCIATION (NWWDA)

NWWDA I.S. 1-A (1997) Architectural Wood Flush Doors

1.2 GENERAL DESCRIPTION

Work in this section includes laminate clad custom casework cabinets as shown on the drawings and as described in this specification. This Section includes high-pressure laminate surfacing and cabinet hardware. Recyclable materials shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS. All exposed and semi-exposed surfaces, whose finish is not otherwise noted on the drawings or finish schedule, shall be sanded smooth and shall receive a clear finish of polyurethane. Wood finish may be shop finished or field applied in accordance with Section 09900 PAINTING, GENERAL.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Shop Drawings; G, AE Installation; G, AE

Shop drawings showing all fabricated casework items in plan view, elevations and cross-sections to accurately indicate materials used, details of construction, dimensions, methods of fastening and erection, and installation methods proposed. Shop drawing casework items shall be clearly cross-referenced to casework items located on the project drawings. Shop drawings shall include a color schedule of all casework items to include all countertop, exposed, and semi-exposed cabinet finishes to include finish material manufacturer, pattern, and color.

SD-03 Product Data

Wood Materials; G, AE Wood Finishes; G, AE Finish Schedule; G, AE

Descriptive data which provides narrative written verification of all types of construction materials and finishes, methods of construction, etc. not clearly illustrated on the submitted shop drawings. Data shall provide written verification of conformance with AWI Qual Stds for the quality indicated to include materials, tolerances, and types of construction. Both the manufacturer of materials and the fabricator shall submit available literature which describes re-cycled product content, operations and processes in place that support efficient use of natural

resources, energy efficiency, emissions of ozone depleting chemicals, management of water and operational waste, indoor environmental quality, and other production techniques supporting sustainable design and products.

SD-04 Samples

Plastic Laminates; G, AE

Two samples of each plastic laminate pattern and color. Samples shall be a minimum of 120 by 170 mm in size.

Cabinet Hardware; G, AE

One sample of each cabinet hardware item specified to include hinges, pulls, and drawer glides.

SD-07 Certificates

Quality Assurance; G, AE Laminate Clad Casework; G, AE

A quality control statement which illustrates compliance with and understanding of AWI Qual Stds requirements, in general, and the specific AWI Qual Stds requirements provided in this specification. The quality control statement shall also certify a minimum of ten years contractor's experience in laminate clad casework fabrication and construction. The quality control statement shall provide a list of a minimum of five successfully completed projects of a similar scope, size, and complexity.

1.4 QUALITY ASSURANCE

Unless otherwise noted on the drawings, all materials, construction methods, and fabrication shall conform to and comply with the premium grade quality standards as outlined in AWI Qual Stds, Section 400G and Section 400B for laminate clad cabinets. These standards shall apply in lieu of omissions or specific requirements in this specification. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified. Contractor must demonstrate knowledge and understanding of AWI Qual Stds requirements for the quality grade indicated.

1.5 MOCK-UP

Prior to final approval of shop drawings, a full-size mock-up shall be provided of a typical floor cabinet and wall cabinet. The mock-up shall include all components and hardware necessary to illustrate a completed unit and shall include a minimum of one door and one drawer assembly. The completed mock-up shall include countertops and back splashes where specified. The mock-up shall utilize specified finishes in the patterns and colors as indicated on the drawings. Upon disapproval, the Contractor shall rework or remake the mock-up until approval is secured. Rejected units shall be removed from the jobsite. Approved mock-up may remain as part of the finished work.

1.6 DELIVERY AND STORAGE

Casework may be delivered knockdown or fully assembled. All units shall be

delivered to the site in undamaged condition, stored off the ground in fully enclosed areas, and protected from damage. The storage area shall be well ventilated and not subject to extreme changes in temperature or humidity.

1.7 SEQUENCING AND SCHEDULING

Work shall be coordinated with other trades. Units shall not be installed in any room or space until painting, and ceiling installation are complete within the room where the units are located. Floor cabinets shall be installed before finished flooring materials are installed.

1.8 PROJECT/SITE CONDITIONS

Field measurements shall be verified as indicated in the shop drawings before fabrication.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

2.1.1 Lumber

All framing lumber shall be kiln-dried Grade III to dimensions as shown on the drawings. Frame front, where indicated on the drawings, shall be nominal 19 mm hardwood.

2.1.1.1 Standing and Running Trim

Standing or running trim casework components which are specified to receive a transparent finish shall be red oak hardwood species, plain sawn. AWI grade shall be premium. Location, shape, and dimensions shall be as indicated on the drawings.

2.1.2 Panel Products

2.1.2.1 Plywood

All plywood panels used for framing purposes shall be veneer core hardwood plywood, AWI Qual Stds Grade AA. Nominal thickness of plywood panels shall be as indicated in this specification and on the drawings.

2.1.2.2 Particleboard

All particleboard shall be industrial grade, medium density (640 to 800 kg per cubic meter), 19 mm thick. A moisture-resistant particleboard in grade Type 2-M-2 or 2-M-3 shall be used as the substrate for plastic laminate covered doors and drawer fronts. Particleboard shall meet the minimum standards listed in ASTM D 1037 and ANSI A208.1.

2.1.2.3 Medium Density Fiberboard

Medium density fiberboard (MDF) shall be an acceptable panel substrate where noted on the drawings. Medium density fiberboard shall meet the minimum standards listed in ANSI A208.2.

2.2 SOLID POLYMER MATERIAL

Solid surfacing casework countertops shall conform to the requirements of

Section 06650 SOLID POLYMER FABRICATIONS.

2.3 HIGH PRESSURE DECORATIVE LAMINATE (HPDL)

All plastic laminates shall meet the requirements of NEMA LD 3 and ANSI A161.2 for high-pressure decorative laminates. Design, colors, surface finish and texture, and locations shall be as indicated on the drawings. Plastic laminate types and nominal minimum thicknesses for casework components shall be as indicated in the following paragraphs.

2.3.1 Horizontal General Purpose Standard (HGS) Grade

Horizontal general purpose standard grade plastic laminate shall be $1.22~\mathrm{mm}$ (plus or minus $0.127~\mathrm{mm}$) in thickness. This laminate grade is intended for horizontal surfaces where postforming is not required.

2.3.2 Vertical General Purpose Standard (VGS) Grade

Vertical general purpose standard grade plastic laminate shall be $0.71~\mathrm{mm}$ (plus or minus $0.012~\mathrm{mm}$) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of casework components where postforming is not required.

2.3.3 Horizontal General Purpose Postformable (HGP) Grade

Horizontal general purpose postformable grade plastic laminate shall be 1.07~mm (plus or minus 0.127~mm) in thithickness. This laminate grade is intended for horizontal surfaces where post forming is required.

2.3.4 Vertical General Purpose Postformable (VGP) Grade

Vertical general purpose postformable grade plastic laminate shall be 0.71 mm (plus or minus 0.012 mm) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of components where postforming is required for curved surfaces.

2.3.5 Cabinet Liner Standard (CLS) Grade

Cabinet liner standard grade plastic laminate shall be 0.51 mm in thickness. This laminate grade is intended for light duty semi-exposed interior surfaces of casework components.

2.3.6 Backing Sheet (BK) Grade

Undecorated backing sheet grade laminate is formulated specifically to be used on the backside of plastic laminated panel substrates to enhance dimensional stability of the substrate. Backing sheet thickness shall be 0.51 mm. Backing sheets shall be provided for all laminated casework components where plastic laminate finish is applied to only one surface of the component substrate.

2.4 THERMOSET DECORATIVE OVERLAYS (MELAMINE)

Thermoset decorative overlays (melamine panels) shall be used for casework cabinet interior and drawer interior surfaces where indicated on the drawings.

2.5 EDGE BANDING

Edge banding for casework doors and drawer fronts shall be PVC vinyl and shall be 3 mmthick. Material width shall be $23.8\ mm$. Color and pattern shall be as indicated on the drawings.

2.6 CABINET HARDWARE

All hardware shall conform to BHMA A156.9, unless otherwise noted, and shall consist of the following components:

- a. Door Hinges: Concealed, self-closing Eurpoean-type, BHMA No. BO1602. Minimum swing shall be 125 degrees.
- b. Cabinet Pulls: Back mounted, 4-inches in length, wire pull type.
- c. Drawer Slide: Side mounted type, BHMA No. B05051 with full extension and a minimum 45kgload capacity. Slides shall include an integral stop to avoid accidental drawer removal.
- d. Adjustable Shelf Support System:
- 1) Recessed (mortised) metal standards, BHMA No. BO4071, finish: brushed. Support clips for the standards shall be closed type, BHMA No. B04081], finish: brushed.

2.7 FASTENERS

Nails, screws, and other suitable fasteners shall be the size and type best suited for the purpose and shall conform to ASTM F 547 where applicable.

2.8 ADHESIVES, CAULKS, AND SEALANTS

2.8.1 Adhesives

Adhesives shall be of a formula and type recommended by AWI. Adhesives shall be selected for their ability to provide a durable, permanent bond and shall take into consideration such factors as materials to be bonded, expansion and contraction, bond strength, fire rating, and moisture resistance. Adhesives shall meet local regulations regarding VOC emissions and off-gassing.

2.8.1.1 Wood Joinery

Adhesives used to bond wood members shall be a Type II for interior use urea-formaldehyde resin formula. Adhesives shall withstand a bond test as described in NWWDA I.S. 1-A.

2.8.1.2 Laminate Adhesive

Adhesive used to join high-pressure decorative laminate to wood shall be a water-based contact adhesive. PVC edgebanding shall be adhered using a polymer-based hot melt glue.

2.8.2 Caulk

Caulk used to fill voids and joints between laminated components and between laminated components and adjacent surfaces shall be clear, 100 percent silicone.

2.8.3 Sealant

Sealant shall be of a type and composition recommended by the substrate manufacturer to provide a moisture barrier at sink cutouts and all other locations where unfinished substrate edges may be subjected to moisture.

2.9 WOOD FINISHES

Paint, stain, varnish and their applications required for laminate clad casework components shall be as indicated in Section 09900 PAINTING, GENERAL. Color and location shall be as indicated on the drawings.

2.10 FABRICATION

Fabrication and assembly of components shall be accomplished at the shop site to the maximum extent possible. Construction and fabrication of cabinets and their components shall meet or exceed the requirements for AWI premium grade unless otherwise indicated in this specification. Cabinet style, in accordance with AWI Qual Stds, Section 400-G descriptions, shall be flush overlay.

2.10.1 Base and Wall Cabinet Case Body

Frame members shall be glued-together, kiln-dried hardwood lumber. Top corners, bottom corners, and cabinet bottoms shall be braced with either hardwood blocks or water-resistant glue and nailed in place metal or plastic corner braces. Cabinet components shall be constructed from the following materials and thicknesses:

- a. Body Members (Ends, Divisions, Bottoms, and Tops): 19 mm particleboard or medium density fiberboard 9MDF) panel product.
- b. Face Frames and Rails: 19 mm hardwood lumber.
- c. Shelving: 19 mm particleboard panel product.
- d. Cabinet Backs: 6 mmveneer core plywood panel product.
- e. Drawer Sides, Backs, and Subfronts: 13 mm panel product.
- f. Drawer Bottoms: 6 mmparticleboard or medium density fiberboard 9MDF) panel product.
- g. Door and Drawer Fronts: 19mm particleboard panel product.

2.10.1.1 Joinery Method for Case Body Members

- a. Tops, Exposed Ends, and Bottoms.
 - 1) Steel "European" assembly screws (37 mmfrom end, 128 mmon center, fasteners will not be visible on exposed parts).
 - 2) Doweled, glued under pressure (approx. 4 dowels per 300 mmof joint).
 - 3) Stop dado, glued under pressure, and either nailed, stapled or screwed (fasteners will not be visible on exposed parts).
- b. Exposed End Corner and Face Frame Attachment.

- 1) For mitered joint: lock miter or spline or biscuit, glued under pressure (no visible fasteners).
- 2) For non-mitered joint (90 degree): butt joint glued under pressure (no visible fasteners).
- c. Cabinet Backs (Wall Hung Cabinets): Wall hung cabinet backs must not be relied upon to support the full weight of the cabinet and its anticipated load for hanging/mounting purposes. Method of back joinery and hanging/mounting mechanisms should transfer the load to case body members. Fabrication method shall be:
 - 1) Full bound, captured in grooves on cabinet sides, top, and bottom. Cabinet backs for floor standing cabinets shall be side bound, captured in grooves; glued and fastened to top and bottom.
- d. Cabinet Backs (Floor Standing Cabinets).
 - 1) Side bound, captured in grooves; glued and fastened to top and bottom.
- e. Wall Anchor Strips shall be required for all cabinets with backs less than 13 mm thick. Strips shall consist of minimum 13 mm thick lumber, minimum 60 mm width; securely attached to wall side of cabinet back top and bottom for wall hung cabinets, top only for floor standing cabinets.

2.10.2 Cabinet Floor Base

Floor cabinets shall be mounted on a base constructed of nominal 50 mm thick lumber. Base assembly components shall be treated lumber. Finished height for each cabinet base shall be not less than the full height of the installed, specified wall base. Bottom edge of the cabinet door or drawer face shall extend below the top of the base as indicated on the drawings.

2.10.3 Cabinet Door and Drawer Fronts

Door and drawer fronts shall be fabricated from 19 mmmedium density particleboard. All door and drawer front edges shall be surfaced with PVC edgebanding, color and pattern as indicated on the drawings.

2.10.4 Drawer Assembly

Drawer components shall consist of a removable drawer front, sides, backs, and bottom. Drawer components shall be constructed of the following materials and thicknesses:

- a. Drawer Sides and Backs For Laminate Finish: 13 mmthick 7-ply hardwood veneer core substrate.
- b. Drawer Sides and Back For Thermoset Decorative Overlay (melamine) Finish: 13 mmthick medium density particleboard or MDF fiberboard substrate.
- c. Drawer Bottom: 6 mmthick veneer core panel product for transparent or plastic laminate finish or thermoset decorative overlay melamine panel product.

2.10.4.1 Drawer Assembly Joinery Method

a. Multiple dovetail (all corners) or French dovetail front/dadoed back, glued under pressure.

or

b. Doweled, glued under pressure.

or

- c. Lock shoulder, glued and pin nailed.
- d. Bottoms shall be set into sides, front, and back, 6 mm deep groove with a minimum 9 mmstanding shoulder.

2.10.5 Shelving

Shelving shall be fabricated from 19 mmmedium density particleboard. All shelving top and bottom surfaces shall be finished with HPDL plastic laminate. Shelf edges shall be finished in a PVC edgebanding.

2.10.5.1 Shelf Support System

The shelf support system shall be recessed (mortised) metal shelf standards. Standards shall be mortised flush with the finishes surface of the cabinet interior side walls, two per side. Standards shall be positioned and spaced on the side walls to provide a stable shelf surface that eliminates tipping when shelf front is weighted. Standards shall be installed and adjusted vertically to provide a level, stable shelf surface when clips are in place.

2.10.6 Laminate Application

Laminate application to substrates shall follow the recommended procedures and instructions of the laminate manufacturer and NEMA LD 3.1, using tools and devices specifically designed for laminate fabrication and application. Provide a balanced backer sheet (Grade BK) wherever only one surface of the component substrate requires a plastic laminate finish. Apply required grade of laminate in full uninterrupted sheets consistent with manufactured sizes using one piece for full length only, using adhesives specified herein or as recommended by the manufacturer. Fit corners and joints hairline. All laminate edges shall be machined flush, filed, sanded, or buffed to remove machine marks and eased (sharp corners removed). Clean up at easing shall be such that no overlap of the member eased is visible. Fabrication shall conform to NEMA LD 3.1 and ANSI A161.2. Laminate types and grades for component surfaces shall be as follows unless otherwise indicated on the drawings:

- a. Base/Wall Cabinet Case Body.
 - 1) Exterior (exposed) surfaces to include exposed and semi-exposed face frame surfaces: HPDL Grade VGS.
 - 2) Interior (semi-exposed) vertical surfaces and inside top: HPDL Grade CLS or Thermoset Decorative Overlay (melamine).
 - 3) Interior bottom surface: HPDL Grade HGS.

- b. Adjustable Shelving.
 - 1) Top and bottom surfaces: HPDL Grade HGS.
 - 2) All edges: PVC edgebanding.
- c. Fixed Shelving.
 - 1) Top and bottom surfaces: HPDL Grade HGS.
 - 2) Exposed edges: PVC edgebanding.
- d. Door, Drawer Fronts, Access Panels.
 - 1) Exterior (exposed) and interior (semi-exposed) faces: HPDL Grade VGS.
 - 2) Edges: PVC edgebanding.
- e. Drawer Assembly.

All interior and exterior surfaces: HPDL Grade CLS or Thermoset Decorative Overlay (melamine).

2.10.6.1 Tolerances

Flushness, flatness, and joint tolerances of laminated surfaces shall meet the AWI Qual Stds premium grade requirements.

2.10.7 Finishing

2.10.7.1 Filling

No fasteners shall be exposed on laminated surfaces. All nails, screws, and other fasteners in non-laminated cabinet components shall be countersunk and the holes filled with wood filler consistent in color with the wood species.

2.10.7.2 Sanding

All surfaces requiring coatings shall be prepared by sanding with a grit and in a manner that scratches will not show in the final system.

2.10.7.3 Coatings

Types, method of application and location of casework finishes shall be in accordance with the finish schedule, drawings and Section 09900 PAINTING, GENERAL. All cabinet reveals shall be painted.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall comply with applicable requirements for AWI Qual Stds premium quality standards. Countertops and fabricated assemblies shall be installed level, plumb, and true to line, in locations shown on the drawings. Cabinets and other laminate clad casework assemblies shall be attached and anchored securely to the floor and walls with mechanical fasteners that are appropriate for the wall and floor construction.

3.1.1 Anchoring Systems

3.1.1.1 Floor

Base cabinets shall utilize a floor anchoring system as detailed on the drawings. Anchoring and mechanical fasteners shall not be visible from the finished side of the casework assembly. Cabinet assemblies shall be attached to anchored bases without visible fasteners as indicated in the drawings. Where assembly abutts a wall surface, anchoring shall include a minimum 13 mmthick lumber or panel product hanging strip, minimum 60 mm width; securely attached to the top of the wall side of the cabinet back.

3.1.1.2 Wall

Cabinets to be wall mounted shall utilize minimum 13 mm thick lumber or panel product hanging strips, minimum 60 mm width; securely attached to the wall side of the cabinet back, both top and bottom.

3.1.2 Hardware

Casework hardware shall be installed in types and locations as indicated on the drawings. Where fully concealed European-style hinges are specified to be used with particleboard or fiberboard doors, the use of plastic or synthetic insertion dowels shall be used to receive 5 mm "Euroscrews". The use of wood screws without insertion dowels is prohibited.

3.1.3 Doors, Drawers and Removable Panels

The fitting of doors, drawers and removable panels shall be accomplished within target fitting tolerances for gaps and flushness in accordance with AWI Qual Stds premium grade requirements.

3.1.4 Plumbing Fixtures

Sinks, sink hardware, and other plumbing fixtures shall be installed in locations as indicated on the drawings and in accordance with Section 15400 PLUMBING, GENERAL PURPOSE.

3.1.5 Caulking

Due to the use of food items and food preparation in the Demonstration Kitchen Area and Kitchen, all cabinet and casework interiors in these areas must be caulked in locations and with a caulk type as required by NSF 2.

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

07000: Outline Specifications

SECTION 07000

DIVISION 7: THERMAL AND MOISTURE PROTECTION - OUTLINE SPECIFICATIONS

PART 1 GENERAL

Text

- 1.1 GENERAL REQUIREMENTS
- 1.1.1 Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 7:

Section 07220A ROOF INSULATION

Section 07240 EXTERIOR INSULATION AND FINISH SYSTEMS

Section 07600A, SHEET METAL WORK GENERAL

Section 007840A, FIRESTOPPING

Section 07900A, JOINT SEALING

Section 007416A, STRUCTURAL STANDING SEAM METAL ROOF (SSSMR)

- 1.2 Section 07240, EXTERIOR INSULATION AND FINISH SYSTEMS EIFS system shall be mechanically fastened.
- 1.3 Section 007416A, STRUCTURAL STANDING SEAM METAL ROOF (SSSMR)

The structural standing seam metal roof shall match the metal roof on the Youth Activity Center in both color and style. Color match may require custom color from some manufacturers.

1.3.1 Thermal Load

Roof panels shall be free to move in response to the expansion and contraction forces resulting from a total temperature range of 104 degrees C during the life of the structure.

1.4 Section 07600A, SHEET METAL WORK GENERAL

Non metallic through wall flashing is not allowed.

PART 2 NOT USED

PART 3 NOT USED

DIVISION 8 – DOORS AND WINDOWS

08000: Outline Specifications

SECTION 08000

DIVISION 8: DOORS AND WINDOWS - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 8: Doors and Windows:

SECTION 08110, STEEL DOORS AND FRAMES

SECTION 08120, ALUMINUM DOORS AND FRAMES

SECTION 08210, WOOD DOORS

SECTION 08330, OVERHEAD ROLLING DOORS

SECTION 08331, METAL ROLLING COUNTER DOORS

SECTION 08360, SECTIONAL OVERHEAD DOORS

SECTION 08520, ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS

SECTION 08584, STORM SHUTTERS FOR WINDOWS (AE GENERATED)

SECTION 08700, BUILDERS' HARDWARE

SECTION 08810, GLASS AND GLAZING

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute

ANSI A250.8

Recommended Specifications For Standard Steel Doors and Frames

1.3 SECTION 08110, STEEL DOORS AND FRAMES

1.3.1 Doors and Frames

Doors and frames shall be factory fabricated in accordance with ANSI A250.8 and the additional requirements specified herein. Door Level shall be heavy duty (Level 2). Exterior doors and frames shall be designation A60 galvannealed. The exterior door to room 138, the storm shelter, shall be a level 4, maximum duty with a level 4 frame. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under Section 08700 BUILDERS' HARDWARE. Doors and frames shall be

reinforced, drilled, and tapped to receive mortised hinges, locks, latches, and flush bolts as required. Doors and frames shall be reinforced for surface applied hardware. Frames shall be welded type. Door frames shall be furnished with a minimum of three jamb anchors and one floor anchor per jamb. Anchors shall be not less than 4.5 mm (7 ga) steel diameter wire. For wall conditions that do not allow the use of a floor anchor, an additional jamb anchor shall be provided. Rubber silencers shall be furnished for installation into factory predrilled holes in door frames; adhesively applied silencers are not acceptable. Reinforcing of door assemblies for closers and other required hardware shall be in accordance with ANSI A250.8 and the conditions of the fire door assembly listing when applicable.

Exterior doors shall have top edges closed flush and sealed against water penetration. Exterior doors shall be thermal insulated doors and shall have a minimum insulation value of Rsi=1.76 (R=10). The interior of thermal insulated doors shall be filled with rigid plastic foam permanently bonded to each face panel

1.3.2 Interior Hollow metal Window Frames

Interior Hollow metal window frames shall be constructed in accordance with HMMA-820, frames shall be 1.44mm(16ga). All interior glazing shall be Laminated Glass in accordance with specification section 08810, Glass and Glazing.

1.4 SECTION 08120, ALUMINUM DOORS AND FRAMES

Doors: $45 \, \text{mm} \times 95 \, \text{mm}$ nominal medium stile entrance doors with mortised and reinforced comer construction equal to Amarlite "73." Framing System: $50 \, \text{mm} \times 115 \, \text{mm}$ framing members with flush glazing and clear sight lines equal to Amarlite "Weatherseal" entrance framing system.

1.5 SECTION 08210, WOOD DOORS

1.5.1 Flush Wood Doors

• Flush wood doors shall be solid core and shall conform to NWWDA I.S. 1-A. Wood doors shall be 5-ply or 7-ply construction with faces, stiles, and rails bonded to the core

1.5.2 Wood Veneer

• Veneer doors shall be Premium Grade plain sawn, book matched, red oak veneer in accordance withNWWDA I.S. 1-A. Vertical stile strips shall be selected to provide edges of same species and/or color as the face veneer.

1.5.3 Finish

Doors shall receive factory coated stain finish and shall be given a transparent finish conforming to AWI-02, Section 1500, Premium Grade, light stain, medium rubbed sheen, close grain effect. Finish shall be AWI factory finish system Number TR3 or TR4. Edges of unfitted doors shall be field finished after fitting to the frames. Color of the stain finish shall be as indicated on the Interior Finish and Materials Legend on the contract drawings. Standard, pre-mixed stain colors shall not limit the ability to match the stain color required. Custom mixing shall be used

where necessary to achieve desired color and results.

1.6 SECTION 08330, OVERHEAD ROLLING DOORS

The curtains shall roll up on a barrel supported at the head of opening on brackets, and shall be balanced by helical torsion springs. stainless steel slats for doors less than 4.6~m 15 feet wide shall be minimum bare metal thickness of 0.71~mm. 0.0281 inches. Doors shall be operated by means of hand-chain with provision made for future installation of electric power t

1.7 SECTION 08331, METAL ROLLING COUNTER DOORS

The curtain shall be fabricated of extruded aluminum slats conforming to ASTM B 221, Alloy 6063, or Type 304 stainless steel slats conforming to ASTM A 240/A 240M, Type 304 or Type 430. Thickness of slat material shall be as required by width of opening or as required by specified fire-rating. Slats shall be approximately 32 to 38 mm 1-1/4 to 1-1/2 inch wide with a depth of crown of 13 mm. 1/2 inch. Alternate slats shall be fitted with end locks to maintain curtain alignment. Bottom of curtain shall be provided with angle or tubular bar reinforcement matching the curtain, and fitted with a resilient bottom seal. The hood shall be of 24 gauge stainless steel conforming to ASTM A 240/A 240M, Type 304 or Type 430. The curtain shall be operated by means of manual push-up with lift handles or continuous full width lift bar.

1.8 SECTION 08360, SECTIONAL OVERHEAD DOORS

1.8.1 Doors

Doors and components shall be designed to withstand wind loads determined by procedures in ASCE 7 and a wind speed of 40m/s. Doors shall be constructed to sustain a superimposed load, both inward and outward, equal to 1-1/2 times the minimum design wind load. The door shall support the superimposed loads for a minimum period of 10 seconds without evidence of serious damage and shall be operable after conclusion of the tests. Doors shall be equipped with torsion springs designed to operate through a minimum of 100,000 cycles. One complete cycle of the door begins with the door in the closed position. The door is then moved to the open position and back to the closed position. Steel Doors: Door sections shall be single skin with integral joint, and shall be formed of hot-dipped galvanized steel. Panels shall be constructed of galvanized steel not lighter than 1.6 mm (16 gauge) 16 gauge with flush surface or 1.0 mm (20 $\,$ gauge) 20 gauge with longitudinal integral reinforcing ribs or 0.7 mm (24 gauge) 24 gauge with longitudinal integral reinforcing ribs and flat bottom V-grooves. Door sections shall be insulated with a minimum Rsi=1.94 W/Msq (R=11) and 26-gauge steel back cover in a white finish.

1.8.2 Tracks

Tracks shall be the manufacturer's standard 76 mm 3 inch equiped with spring stops

1.8.3 Finish

Steel surfaces shall be hot-dip galvanized G60 in accordance with ASTM A 653/A 653M, and shall be treated for paint adhesion and shall receive a

baked on prime coat and a baked on factory finish coat. The paint system shall withstand a minimum of 1500 hours salt spray test in accordance with ASTM B 117 without blistering, bubbling, or rust. Color shall be dark brown to match the other doors and windows.

1.8.4 Operator

Doors shall be operated by means of electric power with auxiliary chain hoist. Electric power operators shall be heavy-duty industrial type. The unit shall operate the door through the operational cycle life specified. The electric power operator shall be complete with electric motor, auxiliary operation, necessary means of reduction, magnetic brake, brackets, push button controls, limit switches, magnetic reversing starter, and other accessories necessary to operate. Trolley type operators shall be used on standard lift and low headroom tracks.

1.8.5 Weatherstripping

Exterior doors shall be provided with weatherproof joints between sections. Head and jambs shall be provided with rubber or vinyl bulb or leaf type weatherstripping, or with nylon-brush type weatherstripping. Bottom of door shall be provided with a compressible neoprene, rubber, or vinyl weather seal. Weatherstripping shall be adjustable. Weatherstripping shall be specifically designed for use with overhead doors. On electric power operated doors, the bottom seal shall be a combination weather seal and sensing edge

1.9 SECTION 08520, ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS

All exterior windows shall have insulated glass in accordance with specification section 08810, Glass and Glazing.

1.9.1 Frames

All units shall have a poured-in-place thermal break in the frame and meet ANSI/AAMA A3 designation for design and performance criteria

1.9.2 Window Types

Windows in clerestories shall be fixed type, HC-70 Class. Windows in lower areas shall be double hung type, HC-70 Class. Double hung windows shall be have the lower sash fixed with a mechanical stop.

1.9.3 Insect Screens

All operable windows shall come complete with insect screens. Frames for screens shall match the window frame color and material.

1.9.4 Finish

Aluminum Finish: Anodized, NAAMM AA-C22A44, dark bronze color.

1.10 SECTION 08584, STORM SHUTTERS FOR WINDOWS

Rolling storm shutters shall meet the Miami-Dade Building Code for both wind loading and large and small object impact.

1.11 SECTION 08700, BUILDERS' HARDWARE

All door hardware shall meet the requirements of Builders Hardware manufacturers association (BHMA)

1.11.1 Hinges

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7. Hinges shall be grade 1, finish 652 on all interior doors except the main entry vestibule which shall be grade 1, finish dark bronze 624. All exterior doors shall have grade 1 stainless steel with a brushed finish, with the exception of the main entry aluminum doors, which shall be grade 1, finish dark bronze 624 . Hinges shall be full mortise $4\ \%\ x\ 4\ \%$ inches.

1.11.2 Lock and latchsets

Lock and latchsets shall be Bored lock, latchsets, series 4000 and shall conform to BHMA A156.2, Grade 1. Bored type locks and latches for doors 35 mm thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Finish shall be brushed satin chrome 652

1.11.3 Closers

Surface type closers shall be Grade 1, C02000 Standard Cover with options PT?4H, Size 1 or 2 through Size 6, and PT-4D with back check position valve. For exterior doors, closers shall be size V for doors less than 914 mm wide, and size VI for doors 914 mm wide and wider. Except as otherwise specified, sizes shall conform to the manufacturer's published recommendations. Closers for outswinging exterior doors shall have parallel arms or shall be top jamb mounted and be thru bolted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90 degree open position. Surface type closers shall be the product of one manufacturer only. Closers shall be thru bolted on all wood doors and all exterior doors.

1.11.4 Exit Devices

Exit Devices shall be modern style touch bar, grade 1 with a 652 finish

1.12 SECTION 08810, GLASS AND GLAZING

1.12.1 Wire Glass

Polished wire glass: clear, Type II, Class 1, Form 1, Mesh MI (welded diamond), UL labeled, nominal 6mm thick

1.12.2 Insulating glass

Insulating glass: 25mm overall thickness consisting of two layers 6mm glass separated by a dehydrated 13mm continuous airspace and hermetically sealed. The exterior lite shall be bronze tint. The interior lite shall be a clear laminated glass. Insulated units shall meet ASTM E774 - Sealed Insulating Class Units, visible light transmittance of 46 percent to 47 percent,

summer daytime U-value of 0.56 to 0.57, winter nighttime U-value of 0.49, shading coefficient of 0.56 to 0.58, and outdoor reflectance of 8 percent

1.12.3 Laminated Glass

Fabricated from two pieces of fully tempered, Condition A (uncoated), Type I, Class 1 (transparent), Quality q3, glass laminated together with a clear [0.38] mm thick polyvinyl butyral interlayer. The total thickness shall be nominally 6 mm.

1.12.4 Mirrors

Mirrors in activity rooms shall be laminated tempered glass. Width of individual mirrors shall be as wide as practicable, with thickness in proportion to area. Each mirror shall be full height. All edges shall be finished.

PART 2 Not Used

PART 3 not used

DIVISION 9 - FINISHES

09000: Outline Specifications

Government-Edited Guide Specifications:

09310A Ceramic Tile
09520 Acoustical Panels
09620A Resilient Athletic Flooring
09670 Seamless Resinous Floor System
09920 Contractor Color Boards

SECTION 09000

DIVISION 9: FINISHES - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 9: Finishes:

Section 09250A, GYPSUM WALLBOARD

Section 09510A, ACOUSTICAL CEILINGS

Section 09650A, RESILIENT FLOORING

Section 09680A, CARPET

Section 09720A, WALLCOVERINGS

Section 09900A, PAINT, GENERAL

1.1.2 Government Edited Specifications

The contractor shall incorporate the following government-supplied, fully edited specification sections as part of the project design:

Section 09310A, CERAMIC TILE

Section 09520, ACOUSTICAL PANELS

Section 09620A, RESILIENT ATHLETIC FLOORING

Section 09670A, SEAMLESS RESINOUS FLOORING

Section 09920, CONTRACTOR COLORBOARDS

CHEMICAL FABRIC AND FILM ASSOCIATION

CFFA-W-101-B

(1995) CFFA Quality Standard for Vinyl Coated Fabric Wallcovering

1.2 SECTION 09250, GYPSUM WALLBOARD

The contractor edited specification section shall include the following material physical characteristics and performance criteria for gypsum wallboard:

1.2.1 General Requirements

Gypsum wallboard shall be min. 16 mm thickness, 1200 mm wide and shall be maximum permissible height. Provide work with fire resistance ratings conforming to assemblies tested and listed by recognized authorities.

1.2.2 Metal Studs

All metal studs shall be min. 0.79mm thickness. In addition the contractor shall design the interior partition framing and furring system to be capable of carrying a transverse load of 24.4 kg/ms with out exceeding either the allowable stress or a deflection of L/240. Ceiling framing for gypsum drywall ceilings shall be a maximum of $400\,\mathrm{mm}$ O.C.. Structural steel studs are addressed in 04220A, NON LOAD BEARING MASONRY VENEER/STEEL STUD WALLS

1.2.3 Standard Gypsum Wallboard

Regular gypsum board shall conform to ASTM C 36/C 36M, and shall be 1200 mm wide.

1.2.4 Fire-Rated Gypsum Wallboard

Fire-rated gypsum board shall conform to ASTM C 36/C 36M, and shall be Type X or Type C as required, 1200 mm wide.

1.2.5 Moisture-Resistant Gypsum Wallboard

Water-resistant gypsum board shall conform to ASTM C 630/C 630M, regular and Type X, with water-resistant paper faces, paintable surfaces, and shall be 1219 mm width and maximum permissible length.

1.2.6 Impact Resistant (Reinforced) Gypsum Wallboard

Impact resistant, reinforced gypsum board shall have a minimum indentation resistance of 91 Kg at 2.5 mm or 204 Kg at 5mm and a minimum penetration resistant rating of 9.67 kg-M for a 16 mm thick sheet of gypsum board.

1.3 SECTION 09510A, ACOUSTICAL CEILINGS

1.3.1 Material Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria for acoustical ceilings:

- A. All acoustical ceiling panels shall utilize an exposed grid suspension system.
- B. Standard Ceiling Panels: Shall be similar in shape, edge detail, and surface pattern to US Gypsum Acoustone "Frost", panel no. 414, FL shadowline bevel edge. Panel shall be foil-backed to resist moisture and assist in sound deadening. Color of all ceiling panels shall be integral throughout the unit. Edge profile for all panels shall be tegular to provide a recessed lip for grid location. Minimum NRC rating for all panels shall be .65. Acoustical units shall conform to ASTM E 1264, Class A. Panels shall be 600 mm x 600 mm x 19 mm thick.
- C. <u>Vinyl-Faced Panels</u>: Shall be used in kitchen and scullery areas where frequent cleaning will be necessary. Panels shall be constructed

to withstand higher than normal humidity and temperature and engineered to withstand temperatures of 40 degrees C and 90 percent relative humidity without visible sag. Edges shall be square with no reveal. Panels shall be 600 mm x 600 mm x 16 mm thick.

- D. <u>Ceiling Grid</u>: Grid for all suspended acoustical ceilings shall be an exposed standard width system. Suspension systems shall conform to ASTM C 635 for intermediate-duty systems. Suspended ceiling framing system shall have the capability to support the finished ceiling, light fixtures, air diffusers, and accessories, as shown. The suspension system shall have a maximum deflection of 1/360 of span length. Seismic work shall be coordinated with ceiling electrical work. A standard 24 mm wide flange, exposed grid suspension system shall be used where indicated on the drawings. Wall molding shall have a flange of not less than 24 mm. System shall consist of a double web steel tee and cap with corrosion resistant coating.
 - 1) Surfaces exposed to view for standard ceiling panels shall be steel with a factory-applied color baked-enamel finish. Outside corner caps shall be provided.
 - 2) Grid for vinyl-faced panels shall be hot-dipped, galvanized with aluminum cap suitable for food processing areas and meeting USDA/FSIS requirements.

1.4 SECTION 09650A, RESILIENT FLOORING

1.4.1 Material Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria for resilient flooring materials:

- A. <u>Vinyl Composition Tile</u>: Vinyl-composition tile shall conform to ASTM F 1066, Class 1, (solid color tile), Class 2 (through pattern tile), Composition 1, asbestos-free, and shall be 305 mm square and 3.2 mm thick. Tile shall have the color and pattern uniformly distributed throughout the thickness of the tile. Flooring in any one continuous area shall be from the same lot and shall have the same shade and pattern.
- B. Rubber Base: Rubber wall base shall be Type TS, thermoset vulcanized extruded type and shall conform to ASTM F 1861, Group 1 (solid). All rubber wall base shall be 102 mm high and a minimum thickness of 3.18 mm. All rubber wall base shall be a manufacturer's standard product in a straight or coved profile, and in locations as indicated and shown on the drawings. No pre-formed outside corners shall be allowed. Rubber wall base shall be provided in continuous roll form (36.5 M coil) to minimize seaming. Factory-cut lengths are not allowed.
- C. Flooring Transition Strips: Solid rubber or vinyl transition strip moldings shall be provided at all locations where dissimilar flooring materials meet, including doorways. Profiles shall be of widths, thickness, undercuts, butting edges, and profile types suitable to provide a smooth, safe transition between dissimilar floor finish materials. Colors shall be as indicated in the Interior Finish Materials Legend on the drawings. Submittals are required for this item.

1.4.2 Installation Criteria

The contractor edited specification section shall include the following installation criteria for wall base:

A. Wall base corners shall not be separate preformed components. Inside and outside corners shall be formed from roll goods utilizing a scribing method as recommended by the wall base manufacturer to provide a continuous one-piece appearance at all corners.

1.5 SECTION 09680A, CARPET

1.5.1 Physical Characteristics

The contractor edited specification section shall include the following material physical characteristics and performance criteria for carpet:

- A. All carpet flooring shall be a patterned carpet tile.
- B. All carpet tile shall be $457~\mathrm{mm} \times 457~\mathrm{mm}$ in size. Carpet construction shall be a tufted, level loop with attached cushion foundation.
- C. Pile fiber shall be a branded 100 percent solution-dyed nylon or a blend of 75 percent branded solution-dyed nylon and 25 percent branded type 66,6 nylon.
- D. Finished pile yarn weight shall be a minimum of 678 grams per square meters.
- E. Pile density factor shall be a minimum of 20-6154.
- F. Cushion backing shall be an attached fiberglass reinforced composite, closed-cell vinyl with a pre-applied "tackifier" consisting of a factory-applied, full spread adhesive.

1.6 SECTION 09720A, WALLCOVERINGS

1.6.1 Physical Characteristics

1.6.1.1 Vinyl Wallcovering

The contractor edited specification section shall include the following material physical characteristics and performance criteria for all vinyl wallcovering:

A. Shall be Type II with a minimum finished total weight of 620 grams per linear meter. Class A flammability rating in accordance with ASTM E-84 is required.

1.6.1.2 Wainscot Vinyl Wallcovering

Vinyl wallcovering shall be used as a wall wainscot application in areas as described in Section 01014, INTERIOR DESIGN REQUIREMENTS. In addition to the requirements listed above, the Contractor edited specification section for the wainscot vinyl wallcovering shall include the following material physical characteristics and performance criteria in accordance with CFFA -W-101-A:

- A. Backing Material: Fabric composed of a Poly-Cotton blend.
- B. Backing Weight: 68 grams per square meter minimum.
- C. Tensile Breaking Strength: Minimum 440 x 432 Newtons.
- D. Tear Strength: Minimum 55×40 .

Wainscot vinyl wallcovering shall include an applied, clear protective finish equal in performance, cleanability, and stain resistance to Bolta Wallcovering's "PreFixx."

1.6.2 Installation Requirements

1.6.2.1 Sisal Fabric Wallcovering

The contractor edited specification section shall include the following installation criteria for sisal wallcovering:

- A. Sisal wallcovering shall be strictly installed using installation methods and equipment recommended by the sisal manufacturer.
- B. Installer shall certify and provide documentation of prior successfully completed installations of sisal wallcovering.
- C. Sisal wallcovering and adhesive shall be provided from the same manufacturer to insure quality and compatability. Adhesive shall be anti-microbial and shall have no VOC emissions.
- D. Exposed side and bottom edges shall receive solid rubber or solid vinyl edge molding equal in performance and profile to Mercer model no. 22, Cove Cap. Color shall closely match the sisal wallcovering.

1.7 SECTION 09900A, PAINT

1.7.1 Physical Characteristics

The contractor edited specification section shall include the following material physical characteristics and performance criteria for paint products:

- A. Interior Latex Paint: Gloss level for walls shall be eggshell. Gloss level for ceilings shall be flat.
- B. <u>Interior Alkyd Enamel</u>: Shall be used on all metal door and window frames. Gloss level shall be semigloss.
- C. <u>Dryfall Paint</u>: Dryfall paint specified for interior ceilings and overhead surfaces such as steel joists, support steel, galvanized structural components shall be a single coat, fast drying, high reflective Galvite epoxy ester paint equal in performance characteristics, specifications, and application to SHERWIN-WILLIAMS COMPANY product no. B-48 W602. Product shall fall dry in ten feet under normal environmental conditions (25 degrees C, 50% RH.
- D. Interior Wood Stain: Transparent type interior wood wiping stain

shall be formulated from manufacturer's first quality standard colors in combination with specified wood species, graining, and finish system to match the finish indicated in the drawing Interior Finish Materials Legend and shown on the project colorboards.

- E. <u>Interior Wood Polyurethane Finish</u>: Interior polyurethane varnish shall be a waterborne, one component, moisture-curing clear finish selected from manufacturer's first quality standard product line.
- F. <u>Interior Epoxy Wall Paint</u>: Shall be waterborne, low VOC, catalyzed type. Gloss level shall be semigloss.
- 1.7.2 Application Criteria and Requirements

The contractor edited specification section shall include the following application criteria:

- A. Transparent Stained Wood:
 - 1) <u>Surface Preparation</u>: Interior wood surfaces to receive transparent stain shall be sanded. Birch, oak, and other open-grain wood to receive stain shall be given a coat of wood filler not less than 8 hours before the application of stain; excess filler shall be removed and the surface sanded smooth.
 - 2) <u>Interior Stain</u>: Interior transparent stains shall be applied to wood surfaces in accordance with stain manufacturer's recommendations including sanding and drying time between coats and before polyurethane is applied. Number of coats shall be dependant on wood species, stain opacity, absorption rate, and required appearance.
 - 3) <u>Polyurethane</u>: Polyurethane shall be applied to stained wood in accordance with the manufacturer's instructions and recommendations for application, curing, sanding, and drying time between coats. The total coating system shall not be less than 2 mils in uniform thickness.
- B. Concrete Masonry Unit Surfaces: All exposed interior concrete block surfaces shall be painted. Block preparation shall include a latex concrete block filler.
- C. Surfaces To Be Painted: The following factory primed, or factory finished surfaces shall be specifically listed to be painted to match the surface on which they appear:
 - 1) Recessed light fixture trim rings.
 - 2) Supply and return air grills and covers.
 - 3) Fire alarm bells and housings, fire warning strobe light housings.
 - 4) Fire extinguisher cabinets and frames.
 - 5) All wall and ceiling access doors and frames on finished surfaces.
 - 6) Convector covers and heating unit enclosures.

- 7) Electrical/breaker box panel doors and frames.
- C. Painting Schedules: An exterior and interior painting schedule shall be provided at the end of the specification section using the format provided in the USFG Guide Specification. A schedule should be supplied for each paint type in combination with each substrate to be painted.

-- End of Section --

SECTION 09310A

CERAMIC TILE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A108.1A		(1992) Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar
ANSI A108.1B		(1992) Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar
ANSI A108.4		(1992) Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive
ANSI A108.8		(1992) Installation of Ceramic Tile with Chemical Resistant Furan Mortar and Grout
ANSI A137.1		(1988) Ceramic Tile
AMERIC	AN SOCIETY FOR TE	STING AND MATERIALS (ASTM)
ASTM C 373		(1988; R 1994) Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products
ASTM C 648		(1998) Breaking Strength of Ceramic Tile
ASTM C 1026		(1987; R 1996) Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling
ASTM C 1027		(1999) Determining Visible Abrasion Resistance of Glazed Ceramic Tile
ASTM C 1028		(1996) Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

TILE COUNCIL OF AMERICA (TCA)

TCA Hdbk (2000) Handbook for Ceramic Tile Installation

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-03 Product Data

Tile; AE

Mortar, Grout, and Adhesive; AE

Manufacturer's catalog data.

Tile; AE

Mortar and Grout; AE

Manufacturers preprinted installation and cleaning instructions.

SD-04 Samples

Tile; AE

Accessories; AE

Samples of sufficient size to show color range, pattern, type and joints.

SD-07 Certificates

Tile; FIO

Mortar, Grout, and Adhesive; FIO

Certificates indicating conformance with specified requirements. A master grade certificate shall be furnished for tile.

1.3 DELIVERY AND STORAGE

Materials shall be delivered to the project site in manufacturer's original unopened containers with seals unbroken and labels and hallmarks intact. Materials shall be kept dry, protected from weather, and stored under cover in accordance with manufacturer's instructions.

1.4 ENVIRONMENTAL REQUIREMENTS

Ceramic tile work shall not be performed unless the substrate and ambient temperature is at least 10 degrees C and rising. Temperature shall be maintained above 10 degrees C while the work is being performed and for at least 7 days after completion of the work. When temporary heaters are used they shall be vented to the outside to avoid carbon dioxide damage to new tilework.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period shall be provided.

PART 2 PRODUCTS

2.1 TILE

Tile shall be standard grade conforming to ANSI A137.1. Containers shall be grade sealed. Seals shall be marked to correspond with the marks on the signed master grade certificate. Tile shall be impact resistant with a minimum breaking strength for wall tile of 41 kg and 113 kg for floor tile in accordance with ASTM C 648. Tile for cold climate projects shall be rated frost resistant by the manufacturer as determined by ASTM C 1026. Water absorption shall be 0.50 maximum percent in accordance with ASTM C 373. Floor tile shall have a minimum coefficient of friction of 0.50 wet and dry in accordance with ASTM C 1028. Floor tile shall be Class III-Medium Heavy Traffic, durability classification as rated by the manufacturer when tested in accordance with ASTM C 1027for abrasion resistance as related to foot traffic.

2.1.1 Porcelain Floor Tile (PFT)

All porcelain floor tile shall be 203 mm by 203 mm (nominal) in size as located on the drawings. All porcelain tile products including floor tile, floor base, and accessories shall be manufactured as standard products from one manufacturer.

2.1.1.1 Vestibules, Lobby, and Toilets

Tile surface shall have a glazed finish with carborundum particles suspended in the glaze to provide a high coefficient of friction. Finish shall be equal in physical properties and slip resistance to Crossville's "Cross-Plus".

2.1.1.2 Kitchen, Scullery, and Dry Storage

Tile surface shall have a integral raised pattern similar to Crossville's "Cross-Tread" or "Cross-Grip" to provide a higher coefficient of friction.

2.1.2 Porcelain Floor Tile Base (PFTB)

Porcelain floor tile base shall be provided and installed at all locations where porcelain tile flooring occurs and shall match the floor tile field color.

2.1.2.1 Coved Base Profile

Coved base shall be installed in locations as noted on the drawings. Base color shall match adjacent porcelain floor tile field color unless otherwise noted on the drawings. Coved base shall be 152 mm high by 203 mm wide (nominal) in size. Coved base shall utilize preformed inside and outside corners at all locations.

2.1.3 Glazed Wall Tile (CWT)

2.1.3.1 Toilets

Glazed wall tile and trim shall be cushion edged with crystalline, bright, or matte finish. Tile shall be $108~\text{mm} \times 108~\text{mm}$ (nominal). Tile color and finish, are shown in the Interior Finish Materials Legend on the drawings.

2.1.3.2 Scullery, Kitchen, and Dry Storage

Glazed wall tile and trim shall be cushion edged with bright (gloss) finish. Tile shall be $152 \text{ mm} \times 152 \text{ mm}$ (nominal). Tile color and finish, are shown in the Interior Finish Materials Legend on the drawings.

2.2 WATER

Water shall be potable.

2.3 MORTAR

Mortar type shall be latex (polymer) modified portland cement. Latex (polymer) additive may be a liquid add mixture similar to TEC #370 "Full Set" with TEC "Extra-Flex" acrylic mortar additive or included as a dry component of the mortar dry mixture similar to TEC "Full Flex.". Mortar shall meet the requirements of ANSI 118.4.

2.4 GROUT

2.4.1 Floor Grout

Floor grout shall be latex-modified, sanded grout complying with ANSI 118.6 similar to TEC "Accucolor" TA-650 with TEC #TA-869 acrylic additive. Color shall be as indicated in the Interior Finish Materials Legend on the drawings.

2.4.2 Wall Grout

Wall grout shall be latex-modified, unsanded grout complying with ANSI 118.6 similar to TEC "Accucolor" TA-620 with TEC #TA-869 acrylic additive. Color shall be as indicated in the Interior Finish Materials Legend on the drawings.

2.5 ORGANIC ADHESIVE

Organic adhesive shall be used to install ceramic wall tile. Organic adhesive shall comply with ANSI A136.1, Type I, for wet areas similar to TEC #122 "Double Duty".

2.6 CAULK

Caulk shall be an acrylic latex type, either sanded (similar to TEC #TA-850) or unsanded (similar to TEC #TA-820). Caulk shall match the color and texture (sanded or unsanded)of the adjacent grout.

2.7 EQUIPMENT

When installing porcelain floor tile up to 305 mm by 305 mm in size, the notch trowel used shall be a minimum of 6.35 mm by 6.35 mm by 9.53 mm. For 305 mm by 305 mm tile or larger, the notch trowel used shall be 6.35 mm by 6.35 mm by 12.7 mm. All trowels shall have a rounded profile.

2.8 ACCESSORIES

Accessories shall include all extrusions and transition-type items used to provide flexible joints or to transition dissimilar flooring heights or materials. Model numbers provided on the drawings are to indicate type and profile required. Contractor shall verify finished flooring material thicknesses to determine the appropriate model number of each type of transition strip to be used and shall request variances as needed.

2.8.1 Metal Moldings and Joint Connectors

Provide and install metal transition strips, flexible joint connectors, and other metal tile accessories in profiles and locations shown in the drawings for floor tile installation on floors.

2.8.2 Rubber and Vinyl Transition Strips

Provide and install rubber and vinyl transition floor moldings and strips in types, profiles, and locations as indicated on the drawings.PART 3 EXECUTION

3.1 PREPARATORY WORK AND WORKMANSHIP

Surface to receive tile shall be inspected and shall conform to the requirements of ANSI A108.1A or ANSI A108.1B for surface conditions for the type setting bed specified and for workmanship. Variations of surface to be tiled shall fall within maximum values shown below:

TYPE	WALLS	FLOORS	
Days Cot Mostos	2	2 0	
Dry-Set Mortar	3 mm in 2.4 meters	3.0 mm in 3 meters	
Organic Adhesives	3 mm in 2.4 meters	1.5 mm in 1 meters	
Latex portland cement mortar	3 mm in 2.4 meters	3.0 mm in 3 meters	
Epoxy	3 mm in 2.4 meters	3.0 mm in 3 meters	

3.2 GENERAL INSTALLATION REQUIREMENTS

Tile work shall not be started until roughing in for mechanical and electrical work has been completed and tested, and built-in items requiring membrane waterproofing have been installed and tested. Floor tile installation shall not be started in spaces requiring wall tile until after wall tile has been installed. Tile in colors and patterns indicated shall be applied in the area shown on the drawings. Tile shall be installed with the respective surfaces in true even planes to the elevations and grades shown. Special shapes shall be provided as required for sills, jambs, recesses, offsets, external corners, and other conditions to provide a complete and neatly finished installation. Tile bases and coves shall be solidly backed with mortar.

3.3 INSTALLATION OF WALL TILE

Wall tile shall be installed in accordance with the TCA Hdbk, method W242-2K. Wall tile shall be installed in locations as indicated on the drawings to include patterns. Patterns shall be continous on all wall surfaces.

3.3.1 Organic Adhesive

Organic adhesive installation of ceramic tile shall conform to ANSI A108.4. Grout size shall not exceed 1.6 mm in width.

3.3.2 Furan Mortar and Grout

Furan mortar and grout installation shall conform to ANSI A108.8.

3.4 INSTALLATION OF PORCELAIN FLOOR TILE

3.4.1 Mortar Bed

A latex (polymer)-modified portland cement mortar bed shall be used to install tile directly over properly cured, plane, clean concrete slabs. Mortar and floor tile shall be installed in accordance with TCA Hdbk, method F 113-2K and ANSI 108.5.

3.4.1.1 Contraction (Control) Joints

Contraction (control) joints shall be detailed as shown on the drawings. Contraction joints shall be filled with a cementitious floor patch material and spanned with a crack isolation membrane similar to TEC #TA-329. Membrane shall extend a minimum of one full tile width to each side of the membrane along the entire length of the contraction joint.

3.4.2 Porcelain Tile

Porcelain floor tile shall be placed into the fresh mortar bed by pressing, then pushing and pulling the tile to achieve as near 100 percent coverage and contact of the tile with the mortar and substrate as possible. Mortar coverage shall be sufficiently distributed to give full support to the tile. All corners and edges shall be backed with mortar. A minimum mortar thickness of 2.25 mm shall be maintained between the substrate and tile. Installer shall periodically remove tiles to assure proper bond coverage consistent with industry standards. Tile shall be installed in patterns and locations as indicated on the project drawings and approved shop drawings. Mortar and floor tile shall be installed in accordance with TCA Hdbk, method F 113-2K and ANSI 108.5.

3.4.2.1 Porcelain Tile Base

Base shall be installed to floor and walls using industry standards. Base shall be backed with mortar including the void created where coved base is installed. Coved portion of coved base shall be flush with adjacent floor tile as detailed in the drawings. Bullnose base shall utilize a metal extrusion flexible corner joint between the base and floor tile as detailed on the drawings.

3.4.3 Floor Tile Grout

Floor tile grout shall be installed in accordance with ANSI 108.10 and in strict accordance with manufacturers recommendations. Mixture rates and set-up times shall conform to manufacturer's instructions in order avoid grout discoloration. Joint size shall not exceed 3/16-inch in width.

3.5 INSTALLATION OF THRESHOLDS, TRANSITION STRIPS AND ACCESSORIES

Metal, rubber, and vinyl thresholds, transition strips, and other extrusion accessories as specified on the drawings used to transition tile flooring from other floor finishes or tile size shall be installed in accordance with the manufacturer's's recommendations and as located on the drawings. Thresholds and transition strips shall be installed the full width of

openings or the entire length of the of the floorings to be transitioned.

3.6 INSTALLATION OF CAULK

An acrylic latex caulk shall be applied at all joints of material transition or where differential movement is known to take place. This shall include but is not limited to inside corners of rooms, at ceiling lines, around perimeters of vanities, etc. Grout fill at these locations is not acceptable. Caulk bead shall not exceed adjoining grout width and shall match the adjoining grout in color and texture.

3.7 CLEANING AND PROTECTING

Upon completion, tile surfaces shall be thoroughly cleaned in accordance with manufacturer's approved cleaning instructions. Acid shall not be used for cleaning glazed tile. Floor tile with resinous grout or with factory mixed grout shall be cleaned in accordance with instructions of the grout manufacturer. After the grout has set, tile wall surfaces shall be given a protective coat of a noncorrosive soap or other approved method of protection. Tiled floor areas shall be covered with building paper before foot traffic is permitted over the finished tile floors. Board walkways shall be laid on tiled floors that are to be continuously used as passageways by workmen. Damaged or defective tiles shall be replaced.

-- End of Section --

SECTION 09520

ACOUSTICAL PANELS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C423

Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

1.2 GENERAL REQUIREMENTS

Acoustical treatment shall consist of sound controlling units mechanically mounted to the wall surface. The unit size, shape, finish, and color shall be as specified herein. The location and extent of acoustical treatment shall be as shown on the drawings.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-01 Data

Acoustical Wall Panel and Banner Product Literature/Descriptive Data; AE.

Acoustical Wall Panel and Banner Installation Instructions-; AE.

SD-04 Drawings

Acoustical Wall Panel and Banners; AE.

Drawings shall show panel and banner dimensions, location plans and elevations, corner and edge details, and method of anchoring and fastening.

SD-13 Certificates

Flammability; AE.

Sound Transmission; AE.

Test reports by an independent testing laboratory attesting that acoustical wall panels and banners meet specified fire endurance and sound transmission requirements.

SD-14 Samples

Acoustical Units; AE.

Two samples of acoustical wall panel and banners showing specified edge and corner details and with specified fabric covering attached. Provide samples of all manufacturer's standard fabrics and colors for selection.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Materials shall be carefully handled and stored in an enclosed climate-controlled, dry, watertight enclosure. Immediately before installation, acoustical units shall be stored for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed to assure temperature and moisture conditions.

1.5 ENVIRONMENTAL REQUIREMENTS

A uniform temperature of not less than 60 degrees F nor more than 85 degrees F and a relative humidity of not more than 50 percent shall be maintained before, during, and after installation of acoustical units.

1.6 SCHEDULING

Interior finish work such as painting, staining, ceiling tile installation, and electrical work shall be complete and dry before installation. Mechanical, electrical, and other work shall be completed in order to maintain temperature and humidity requirements.

PART 2 PRODUCTS

2.1 ACOUSTICAL WALL PANEL UNITS

Acoustical panels shall be a rigid sound absorbing panel product mounted to the wall to effectively reduce the sound reverberation in the room in which they are installed. Panels shall have physical properties and performance characteristics equal to panel product manufactured by Golterman & Sabo (G & S) "Acoustic-Panel AP 2". Maximum panel dimensions shall be 1219 mm wide by 3050 mm high.

2.1.1 Physical Criteria

Core material shall be 51 mm thick 6-7 pcf smooth-faced, dimensionally stable, molded fiberglass with chemically hardened edges. The minimum NRC rating shall be 1.05 in accordance with ASTM C423. Panel side edges shall have a square profile. Panel top and bottom edges shall have a chamfered edge profile. Panels shall have a fabric covering. Panel dimensions shall be as noted in the drawings.

2.2 ACOUSTICAL BANNERS

Acoustical banners shall be a flexible sound absorbing product draped throughout the open ceiling in locations and quantities to effectively reduce the sound reverberation in the room in which they are installed. Banners shall have physical properties and performance characteristics equal to the banner product manufactured by Golterman & Sabo (G & S) "BN 2".

2.2.1 Physical Criteria

Acoustical banners shall be composed of a smooth-faced, dimensionally stable 51 mm pcf fiberglass core with a PVC vapor barrier backing sheet. The minimum NRC rating shall be 1.00 in accordance with ASTM C423. Banners shall have a fabric covering. Banner edges shall be square. Maximum dimensions for each banner shall be 3050 mm wide by 15.3 meters in length with intermediate support stiffeners provided at 4.6 meters O.C.

2.3 FABRIC COVERING

Panel fabric for acoustical panels and banners shall be a standard quality offered by the manufacturer. Color shall be selected from manufacturer's standard colors. Fabric covering shall be factory bonded to the core to prevent sag or distortion. Bonding method shall be in accordance with fabric manufacturer's recommendations. No seams shall be permitted in the covering. All edges shall be wrapped and returned neatly to back of core. All fabric shall be from the same dye lot. Minimum fabric requirements include the following:

A. Fiber Content: 100 percent Terratex Polyester.

B. Width: 1676 mm.

C. Weight: 16 ounces per linear yard.

2.4 FIRE RESISTIVE TESTING

Acoustical products and fabric coverings shall be rated for class A fire endurance as indicated when tested in accordance with ASTM E 84.

2.5 CEILING SOUND TRANSMISSION CLASS AND TEST

Acoustical products shall be tested using a Type "A" mounting in accordance with ASTM C423 with E-400 testing method to obtain the Noise Reduction Coefficient (NRC) rating.

PART 3 EXECUTION

3.1 INSTALLATION

Acoustical panels and banners shall be provided complete with all necessary fastenings, clips, and other accessories required for a complete installation in accordance with panel manufacturer's recommendations. Mechanical fastenings for panels shall not be exposed in the finished work. Panels and banners shall be installed straight and true in quantities, locations, and to dimensions as shown on the approved shop drawings.

3.1.1 Acoustical Panels

Provide a minimum of 93 square meters of wall panels which, in combination with the ceiling banners, shall produce a maximum 2 second reverberation time in accordance with the Sabine Formula analysis. Panels shall be installed so that the bottom of the panels are a minimum of 3000 mm above the finished floor and in such a manner as to provide a consistent and uniform pattern on all four walls. Fastening system shall be by means of mechanical clip fasteners as recommended and provided by the panel manufacturer. Resulting installation shall provide a rigid, permanent mount for each panel.

3.1.2 Acoustical Banners

Provide a minimum of 93 square meters of acoustical banners which, in combination with the wall panels, shall produce a maximum 2 second reverberation time in accordance with the Sabine Formula analysis. Banners shall be installed directly to the deck and between the bar joists and shall provide a uniform pattern across the ceiling area. Banners shall be allowed to drape below the bar joists. Fastening system shall be by means of dual grommets installed as needed to establish billow as dimensioned shown on the approved shop drawings. Hardware for installation shall be provided by the installer.

3.2 CLEANING

Following installation, dirty or discolored surfaces of acoustical units shall be cleaned and left free from defects. Units that are damaged or improperly installed shall be removed and new units provided as directed.

-- End of Section --

SECTION 09620A

RESILIENT ATHLETIC FLOORING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 920	(1998) Elastomeric Joint Sealants
ASTM D 395	(1998) Rubber Property - Compression Set
ASTM D 412	(1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 1054	(1991) Rubber Property - Resilience Using a Rebound Pendulum

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Approved Detail Drawings; AE

Drawings showing roll direction and seam locations

SD-03 Product Data

Installation; AE

Manufacturer's descriptive data, technical data sheets and catalog cuts for flooring materials and adhesives to include physical characteristics and performance data. Installation, cleaning and maintenance instructions shall be included.

SD-04 Samples

Flooring; AE

Three samples minimum 225 x 275 mm $\,$ of each color of flooring material required.

SD-07 Certificates

Materials; AE

Manufacturer's certificates stating that the resilient athletic flooring materials conform to the specified requirements. Labels or markings affixed to manufacturer's products attesting that products meet requirements specified herein will be accepted in lieu of certificates.

1.3 QUALIFICATIONS

The manufacturer shall be a firm experienced in the manufacturing of prefabricated rubber sport flooring. Installer must be able to show successful completion of installations of the same scale and product within the last three years. Adhesive applied flooring shall be installed by an experienced floor applicator approved by the manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered in manufacturer's original unopened containers with labels intact in a controlled environment of a minimum temperature of 13degrees C and less than 50 percent relative humidity. Materials shall not be delivered to the installation area or installed before all work that may damage the materials or the finished floor, such as overhead work, is completed. Materials shall be stored in a clean, dry area. Protection boards shall be stored flat and off the ground.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.6 EXTRA MATERIALS

The contractor shall provide additional amounts of flooring representing 2 peercent of the total surface. Additional material shall be provided from the same dye lot as the installed flooring.

PART 2 PRODUCTS

2.1 SHEET RUBBER COMPOSITION FLOORING

Prefabricated sheet rubber sport flooring shall be homogeneous, natural and synthetic rubbers, and shall be minimum 8 mm thick, and shall have smooth gymnasium mat finish. Flooring shall be roll, sheet type not less than 1830 mm wide and lengths of 6 M to 12 M. Flooring shall be calendered and vulcanized with a base of natural and sysnthetic rubber, stabilizing agents and pigmentation. Flooring shall be manufactured in htree layers, which are vulcanized together. The shore hardness of the lower layer to be less than the upper layer, shore hardness of the respected layers to be

recommended by the manufacturer and within limits hereinafter specified. Field laminated triple durometer are unacceptable.

2.1.1 Physical Properties

Flooring shall have a minimum tensile stress at 100 percent elongation of 1500 kPa and a minimum ultimate elongation of 250 percent when tested in accordance with ASTM D 412. Flooring shall be able to withstand 50 percent compression for 72 hours at 22 degrees C with a residual deformation of less than 10 percent when tested in accordance with ASTM D 395. Flooring shall provide a 55 plus or minus 5 percent rebound when tested in accordance with ASTM D 1054. Additional physical properties of the prefabricated sport flooring shall conform to the requirements listed below:

PHYSICAL PROPERTIES
STANDARD
SPECIFICATION

Hardness Shore A ASTM D2240 72 / 55

Critical Radiant Flux ASTM E648
1.03 Watt/sq. cm.

Class 1

Static Load Limit ASTM F970 0.004

Fungal Resistance Test ASTM G21-90 No Growth

Coefficient of Friction ASTM D2047 Dry 1.10, Wet 1.10

V.O.C. Compliance ASTM D5116 Yes

2.2 ADHESIVES

Adhesive shall be a two part polyurethane adhesive suitable for adherence tof a sheet good to asphalt, concrete, or urethane substrate. Adhesive shall be as recommended by the flooring manufacturer and must correspond to the specified flooring product and to the substrate.

2.3 CRACK FILLER/LEVELER FOR CONCRETE SURFACES

Crack filler/leveler for concrete floor surfaces shall be as recommended by flooring manufacturer.

2.4 PRIMER

Concrete primer shall be as recommended by flooring manufacturer and must correspond to the specified flooring product and to the substrate.

2.5 MANUFACTURERS COLOR

Color shall be selected from manufacturer's standard colors.

PART 3 EXECUTION

3.1 SITE CONDITIONS

3.1.1 Environmental Requirements

A stable room and subfloor temperature shall be maintained, minimum 65 degrees F13 degrees C and less than 50 percent relative humidity, for a period of 48 hours prior to, during, and 48 hours after installation.

3.1.2 Subfloor Conditions

Subfloor preparation shall be accomplished by the General Contractor. Concrete subfloor surfaces shall be completely cured and dry for a minimum of 30 days. No curing agents, sealers, or hardeners shall be used to aid in the curing of the concrete slab. Surfaces shall be free of paint spots, and other foreign materials. Surfaces shall be ground down or leveled with an approved leveling compound to a tolerance of plus or minus 3 mm within a 3 meters radius. Cracks, construction joints, or damaged portions of floor shall be filled with rubber flooring manufacturer approved crack filler for concrete surfaces. Expansion joints shall be filled and sealed in accordance with the approved installation instructions of the manufacturer. All sealants shall be in accordance with ASTM C 920. Expansion joints shall not be filled with a material that will make them inoperable.

3.1.2.1 Moisture Test

Insure that concrete subfloor is dry and exhibits neutral alkalinity. Moisture (calcium chloride) tests shall be performed in accordance with ASTM 1869-98.

3.2 INSTALLATION

3.2.1 General Requirements

Installation shall be in accordance with the approved installation instructions. Sheet flooring shall be rolled with a medium-sized roller in both directions to release entrapped air. Sheet flooring shall be dry cut and layed out flat a minimum of 24 hours prior to adhering to the substrate. End seams shall be single cut. Edge seams shall be cut through overlapping sheets, then snapped into place to ensure tight seams. Seams shall be weighted as required.

3.3 PROTECTION

The installed flooring shall be protected from soiling and damage with heavy reinforced, nonstaining kraft paper, plywood, or hardboard sheets as required. Edges of kraft paper protection shall be lapped and secured to provide a continuous cover. Protective covering shall be removed when directed by the Contracting Officer.

-- End of Section --

SECTION 09670

SEAMLESS RESINOUS FLOOR SYSTEM

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-01 Data

Resinous Flooring System; AE.

Flooring manufacturer's descriptive data, mixing, proportioning, and installation instructions. Maintenance literature for flooring shall be included.

SD-09 Reports

Testing; AE.

Reports of tests certifying conformance to all minimum performance characteristics as specified below. Each report shall be properly identified. The test methods used shall be identified and the test results shall be recorded. I-P measurement testing results shall be allowed where standard testing methods use I-P, rather than metric, measurements.

SD-13 Certificates

Resin-Based Flooring System; AE.

Manufacturer's certificates indicating conformance with specified requirements and flooring manufacturer's approval of the flooring applicator.

SD-14 Samples

Resin-Based Flooring System; AE.

Two 150 mm \times 150 mm (minimum size) samples of each resinous flooring color specified.

1.2 OUALIFICATION OF APPLICATOR

Independent application contractor shall be approved and certified by the flooring manufacturer and shall have a minimum of 5 years experience in the application of the materials to be used.

1.3 DELIVERY AND STORAGE

Materials shall be delivered to the project site in manufacturer's original unopened containers. Materials shall be kept in a clean, dry, area with temperatures controlled between 10 to 33 degrees C.

1.4 ENVIRONMENTAL REQUIREMENTS

Areas to receive industrial resin-based flooring shall have the slab and atmosphere maintained at a temperature above 10 degrees C for 2 days prior to installation and for 7 days following installation.

1.5 FIELD EXAMPLES

Prior to commencing work the approved applicator shall install a 9 square meter sample at the jobsite for each color and pattern specified. Remove disapproved sample and reinstall sample as requested by the Contracting Officer's Representative until acceptable. The approved field example shall serve as the standard for the entire project.

PART 2 PRODUCTS

2.1 SEAMLESS RESIN-BASED FLOORING (SRF)

Resin-based flooring shall be broadcast (spray) applied type, solvent-free, seamless, epoxy floor finish system of 3 mm thickness with properties and chemical resistance conforming to the performance characteristics specified below. Product shall be equal to VALSPAR, FEDERAL FLOORING DIVISION "QUARTZITE 6000" or STONEHARD "Stone Shield HRI". Colors shall be as shown in the drawings.

2.1.1 Material Formulation

Floor system shall be a carefully graded blend of multi-colored, ceramic-coated quartz grains aggregate in a clear polymer matrix with a clear grout/topcoat.

2.1.2 Coved Wall Base

A 100 mm high turned up coved base with a 25 mm radius cove shall be provided on all walls abutting the resinous flooring. Coved base shall be seamless and integral with the flooring material. Formed cove base shall same thickness as flooring.

2.2 PERFORMANCE CHARACTERISTICS

I-P measurement testing results are shown where standard testing methods use I-P, rather than metric, measurements. Resinous flooring shall meet the following minimum performance characteristics:

Property	Test Method	Result
Tensile Strength	ASTM C 307	1,960 psi

Property	Test Method	Result
Water Absorption	ASTM C 413-88	0.2%
Coefficient of Thermal Expansion	ASTM C 531-90	1.32 x 10-5 in/in/0F
Compressive Strength	ASTM C 579-91	10,400 psi (72.0 MPa)
Flexural Strength	ASTM C 580-90	3200 psi (22MPa)
Curing Shrinkage	ASTM D 531-90	$3.75 \times 10-4 \text{ in/in}$
Shore D Hardness	ASTM D 2240-91	85
Abrasion Resistance	ASTM D 4060-90	0.105 gram
Moisture Vapor Permeability	ASTM E 96-80	0.06 perms
Impact Resistance	Gardner Impact	>160in lb
Flammability	ASTM E 84	<35 Flame Spread

2.3 CHEMICAL RESISTANCE

Resin-based flooring shall be chemically resistant and unaffected by the following:

20% Hydrochloric Acid 10% Lactic Acid Urine Tea
Coffee Mustard
Ethyl Alcohol Mercurochrome
Iodine Betadyne

2.4 PRIMER

Primer shall be a material recommended by the industrial resin-based flooring manufacturer which will penetrate the pores of the substrate and bond with the topping to form a permanent monolithic bond between the substrate and the topping.

2.5 RESIN

Binder and all successive grout and top coats shall be 100 percent solids clear/epoxy resin. No pigmented epoxy base or top coats shall be allowed. Resin shall be suitable for the type application indicated.

2.6 FILLERS

Floor system shall contain a carefully graded blend of multi-colored ceramic coated quartz grains. Fillers shall be furnished in the quantity necessary to impart the required color and physical characteristics. The filler shall contain sufficient fines to provide an even-textured, nonslip type of surface on the finished topping.

2.7 SEALER

Sealer shall be a product recommended by the industrial resin-based

flooring manufacturer. When applied to the resin topping and dry, it shall be nonslip and resistant to staining.

2.8 ANTIMICROBIAL

Floor system shall contain an inherent broad-spectrum anti-microbial agent which shall actively inhibit the growth of fungi and prevent the proliferation of many types of gram-positive and gram-negative bacteria. The anti-microbial capability shall last throughout the life of the flooring system.

2.9 WATERPROOF MEMBRANE

An elastomeric waterproof membrane shall be installed at all below grade locations of seamless resinous flooring or as recommended by the resinous flooring applicator. Membrane shall be provided by the resinous flooring manufacturer and shall be specifically designed for the type of resinous flooring installed.

PART 3 EXECUTION

3.1 PREPARATION OF CONCRETE SUBFLOOR

3.1.1 Surface Preparation

A light steel trowel finish is required on all concrete subfloors to receive resinous flooring. Concrete must be clean, crack-free, sound and durable (minimum compression strength of 3000psi). Installation of the floor topping shall not commence until the concrete substrate is at least 28 days old. Concrete after surface preparation shall be free of sealers or membrane curing agents.

3.1.2 Moisture Requirements

Concrete subfloor must be dry (3% maximum moisture content by mass.) before installation of resinous flooring is begun. Concrete must be free of hydrostatic and/or capillary moisture pressure and should not be in direct contact with the ground. An effective vapor barrier and properly engineered soil are required. Concrete subfloors containing destructive or non-destructive moisture shall be tested and prepared in accordance with resinous flooring manufacturer's instructions and recommendations.

3.2 MIXING, PROPORTIONING, AND INSTALLING

Mixing, proportioning, and installing shall be in accordance with the approved instructions of the manufacturer using equipment specifically designed for the type of resinous flooring installed. Flooring shall be installed to a uniform nominal thickness of 3 mm utilizing a double broadcast application requiring aggregate to be broadcast into the resin a minimum of two times. Single broadcast application method is not permitted. Apply elastomeric waterproof membrane in areas as recommended by the certified installer. Completed work shall match approved samples and shall be uniform in thickness, sheen, color, pattern, and texture. Completed work shall be free of defects detrimental to performance.

3.2.1 Coved Base

Install seamless coved base at perimeter of all resinous flooring and at all other locations where the resinous flooring abuts wall surfaces. Coved

base shall be trowel applied to a thickness equal to the flooring using the same materials as the flooring. Coved base shall be hand sanded, and include three coats of resin to assure a smooth surface and cove. Resin shall not be allowed to puddle in the cove.

3.3 PROTECTION

The resinous flooring shall be covered and protected from damage until completion of the work of all other trades.

-- End of Section --

SECTION 09920

CONTRACTOR COLOR BOARDS

PART 1 GENERAL

1.1 GENERAL

This section covers only the color of the exterior and interior materials and products that are exposed to view in the finished construction. Reference the INTERIOR FINISH MATERIALS LEGEND in the drawings for those interior finishes and items requiring color selection. The word "color" as used herein includes surface color and pattern. Requirements for quality and method of installation are covered in other appropriate sections of the specifications. Specific locations where the various materials are required are shown on the drawings. Items not designated for color in this section may be specified in other sections. When color is not designated for items, the Contractor shall propose a color for approval.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-14 Samples

Color board; G, EC (Two Sets) AE (One Set).

3 sets of color boards.

PART 2 PRODUCTS

2.1 COLORBOARDS

2.2 Binder Cover

All colorboards shall be presented in a set of 3-ring "D" binders large enough to adequately hold all colorboards. Binders shall include plastic sleeves on the front and spine to accept contractor supplied inserts with the project name, number, and date.

2.3 Boards

The colorboards shall be fabricated from presentation (mat) board with a rigid substrate such as 3 mm foam core board to provide a stable surface for sample attachment.

2.4 Samples

Colorboard samples shall reflect all actual finish textures, patterns, and colors required for this contract as specified in the Interior Finish Schedule, Exterior Finish Schedule, and the Interior Finish Materials Legend found in the Contractor's AE design drawings. Patterned samples

shall be of sufficient size to adequately show the pattern and its repeat if a repeat occurs.

2.5 Sample Labeling

All samples shall be labeled on the colorboards with the manufacturer's name, and the pattern and color name and number. Samples shall also be keyed or coded to match any key or code system used in the Contractor's AE design drawings.

2.6 REFERENCE TO MANUFACTURERS COLORS

Manufacturers' colors specified in the approved AE design and shown on the AE design colorboards shall not be intended to limit the selection of equal products from other manufacturers by the Contractor. However, variances from the manufacturer's colors shown on the approved AE design colorboards, drawings, and specifications must be annotated and highlighted for review.

2.7 MATERIAL QUALITY

Samples submitted as part of the Contractor color boards are for color, pattern, and texture approval only. Material quality including specifications and performance requirements shall be reviewed as part of the material's individual submittal section as shown in the submittal register as part of 01330, Submittal Procedures. Samples approved as part of the color board submittal may be disapproved at a later date if, after review, specifications or performance characteristics do not meet the project requirements.

PART 3 EXECUTION

3.1 MOUNTING

All samples shall be securely mounted to the presentation boards using hot-melt glue or other permanent adhesive which will insure the samples will not come loose during shipping or use.

-- End of Section --

DIVISION 10 - SPECIALTIES

10000: Outline Specifications

Government-Edited Guide Specifications:

10500 Lockers

SECTION 10000

DIVISION 10: SPECIALTIES - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Contractor Edited Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 10: SPECIALTIES:

Section 10160A, TOILET PARTITIONS

Section 10260A, WALL PROTECTION

Section 10440A, INTERIOR SIGNAGE

Section 10800A, TOILET ACCESSORIES

1.1.2 Government Edited Specifications

The contractor shall incorporate the following government-supplied, fully edited specification sections as part of the project design:

Section 10500, LOCKERS

1.1.3 Contractor Created Specifications

As part of the project design, the contractor shall create and provide the following specification sections:

Section 10520, FIRE EXTINGUISHER CABINETS AND ACCESSORIES

Section 10670, METAL UTILITY SHELVING

Specifications shall be created and provided in Specsintact format.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 256	(1997) Determining the IZOD Pendulum Impact Resistance of Plastics
ASTM D 635	(1998) Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM E 84	(19998e1) Surface Burning Characteristics of

Building Materials

1.3 SECTION 10160A, TOILET PARTITIONS

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. Partition system shall be constructed of solid phenolic material to include a solid phenolic black edge on all panels, stiles, and doors.
- B. Partitions shall be floor anchored style.
- C. All hardware shall be 304 stainless steel. Finish shall be highly resistant to alkalies, urine, and other common toilet room acids.
- D. Partitions and stalls designed for handicap accessibility shall meet all ADA requirements.
- E. Provide institutional hardware equal in construction and performance to BOBRICK "Institutional Hardware."
- F. Minimum 10-year warranty against delamination, corrosion, or breakage.

1.4 SECTION 10260A, WALL PROTECTION

1.4.1 Material and Performance Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. <u>General</u>. Units shall be surface mounted. Mounting hardware, cushions, and base plates shall be furnished. Assembly shall consist of a snap-on cover formed from high impact resistant resilient material, minimum 1.98 mm thick, mounted on a continuous aluminum retainer with no visible fasteners upon completion of installation. Aluminum retainer shall have a minimum thickness of 1.60 mm and shall be installed over the wall finish material.
- B. Resilient Material. Resilient material shall consist of high impact resistant extruded acrylic vinyl, polyvinyl chloride, or injection molded thermal plastic and shall conform to the following: $\frac{1}{2} \sum_{i=1}^{n} \frac{1}{2} \sum_{i=1}^{n} \frac{1}{2$
 - 1) Minimum Impact Resistance. Minimum impact resistance shall be 960.8 N.m/m when tested in accordance with ASTM D 256, (Izod impact, ft. lbs per sq inch notched).
 - 2) Fire Rating. Fire rating shall be Class 1 when tested in accordance with ASTM E 84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less. Material shall be rated self extinguishing when tested in accordance with ASTM D 635. Material shall be labeled and tested by an approved nationally known testing laboratory. Resilient material used for protection on fire rated doors and frames shall be listed by the testing laboratory performing the tests. Resilient material installed on fire rated wood/steel door and frame assemblies shall have been tested on similar type assemblies. Test results of material tested on any other combination of door/frame assembly will not be

acceptable.

- 3) Integral Color. Colored components shall have integral color and shall be matched in accordance with SAE J1545 to within plus or minus 1.0 on the CIE-LCH scales.
- C. <u>Aluminum Retainers</u>. Retainers shall be fabricated from extruded aluminum alloy 6030-T6. Minimum strength and durability properties as specified in ASTM B221. Thickness shall be as indicated in this specification for each type of wall protection.
- D. <u>Corner Guard Assemblies</u>. Corner guard assemblies shall be surface mounted. Resilient acrylic/vinyl cover shall snap over wall-mounted aluminum retainer with no visible fasteners. Corner guards shall extend from the top of wall base to the ceiling unless otherwise noted on the drawings. Corner guard face shall be 76 mm wide with a radiused, bullnose profile. Factory fabricated end closure caps shall be furnished for top and bottom of surface mounted corner guards.
- E. Wall Guard (Chair Rail) Assemblies. Shall be provided with prefabricated end closure caps, outside corners, concealed splices, cushions, mounting hardware and other accessories standard with the manufacturer. End caps and corners shall be field adjustable to assure close alignment with wall guards. Wall guards shall be in profiles and colors as shown on the drawings. Wall guard face shall be a minimum 100 mm high and a maximum 21 mm deep and shall equal in profile design and performance to Construction Specialties' Model No. SCR-40.

1.4.2 Installation Criteria

The contractor edited specification section shall include the following installation criteria:

- A. Continuous horizontal structural internal wall support shall be provided for evenly spaced anchorage of the wall guard aluminum retainer to the wall.
- B. Wall guards (chair rails) shall utilize pre-fabricated outside corners at all locations where wall guards are located. Wall guards located in corridors shall terminate at interior door or window frames by direct abutment with a finished end cap. All wall guards shall terminate a maximum of 25 mm at inside corners. Spacers shall be provided in a thickness as necessary to allow wall guard to wrap outside corners over the top of corner guards.
- 1.5 SECTION 10520, FIRE EXTINGUISHER CABINETS AND ACCESSORIES

1.5.1 Material and Performance Criteria

The contractor created and edited specification section shall include the following material physical characteristics and performance criteria:

- A. Die-formed steel cabinet, trims and door frames, with factory finish of baked enamel, flush, or semi-recessed mounted type as appropriate, with rolled return trim and vertical half glass type door panels with a handle. Administrative area cabinets shall accommodate 4.5 Kg ABC extinguishers.
- 1.6 SECTION 10440A, INTERIOR SIGNAGE

1.6.1 Material and Performance Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

- A. All signage shall be supplied by and produced from a single manufacturer.
- B. All signage shall meet ADA requirements with regard to raised typography and corresponding Braille.
- C. All signage shall utilize a common background, frame, and typography color.
- D. Each room shall be supplied with a room identification sign consisting of a plaque face and a $200~\text{mm} \times 200~\text{mm}$ square holder with raised frame edge.
- E. All room identification plaque signage with the exception of toilet rooms shall contain a 50 mm high, Helvetica Bold, raised room number in the upper left hand portion of the sign face. The lower portion shall contain the raised room name, Helvetica Medium, all caps, 16 mm high, left justification.
- F. Toilet Room pictographs shall include the universal symbol for man or woman and also the handicap symbol where applicable. Unisex toilets shall contain both man and woman pictographs. Pictographs shall be provided subsurface.
- G. Construction, quality, and performance shall be equal to APCO's "IM Series".

1.6.2 Installation Criteria

The contractor edited specification section shall include the following installation criteria:

- A. All room identification signage shall be located and installed on the wall to the to the latch side of the door opening wherever possible. Toilet room signage shall be centered on the doors.
- B. All signage shall be mounted flush to the wall utilizing a slotted, tamper-proof backplate mounting system with concealed mechanical fasteners, one per corner.

1.6.3 Master Signage List

The specification section shall include a master signage list which is coded and cross-referenced to a drawing location plan which identifies each sign, sign type, along with the required room number, room name, and typography symbol (where required).

1.6.4 Additional Signage Units

At the request of the government, the contractor shall provide, at no additional cost to the government, a maximum quantity of 10 signage units not to exceed 200 mm square with a maximum number of 100 typography characters per sign. This quantity shall be in addition to those shown on

the approved master list. Typography content to be determined and provided by the User through the Government Contracting Representative.

1.7 SECTION 10670, METAL UTILITY SHELVING

Utility shelving shall be a heavy-duty type constructed of steel components and attachments with steel or particleboard shelving surfaces. Shelving units shall be to dimensions and in locations as shown on the drawings. Unit widths shall vary as necessary and provided in combinations of starter and add-on units in order to provide the overall lengths shown on the drawings.

1.7.1 Enclosed Heavy-Duty Shelf Units

The contractor edited specification section shall include the following material physical characteristics and performance criteria for enclosed shelving:

- A. Shall include end panel, back panel, enclosed base, and top with a minimum of 5 adjustable shelves for each unit.
- B. Posts shall include both angle and box posts.
- C. The base and top shall be considered shelving surfaces and shall be constructed of the same gauge as the adjustable shelving.
- D. Shelving shall be rated as heavy-duty, Class 1 and shall be constructed with front and rear box beam flanges for superior shelf rigidity.
- E. All components shall be receive a factory baked enamel finish.
- F. Shelving units shall be equal in construction, metal gauge, and design to PENCO "Clipper" industrial shelving.
- G. Shelving unit depth shall be 305 mm and a minimum height of 2210 mm.

1.7.1.1 Location

Enclosed storage shelving units shall be located in Room 126, Storage.

1.7.2 Open Industrial Shelf Units

The contractor edited specification section shall include the following material physical characteristics and performance criteria for open industrial shelving:

- A. Units shall include steel posts, supports, center supports, and 19mm thick particleboard shelving.
- B. Provide a minimum of 4 adjustable shelves per unit.
- C. Minimum shelf capacity shall be $250\ \mathrm{kg}$ without noticeable deflection.
- D. Beams shall be rated as heavy angle beam with double rivet connections.
- E. Units shall equal in construction and performance to PENCO "Double

Rivet Bulky Storage Shelving."

F. Units shall be 610 mm deep.

1.7.2.1 Location

Open industrial shelf units shall be provide in Room 130 - Storage Room, Room 132 - Storage and Issue, and the Outside Storage Cage located in Room 132.

1.7.3 Installation Criteria

The contractor edited specification section shall include the following installation criteria for all metal utility shelving:

- A. Each unit shall be securely anchored to the walls, floor, and adjoining units.
- 1.8 SECTION 10800A, TOILET ACCESSORIES

1.8.1 General Requirements

All accessory types shall be of the same make and model for both children and single occupancy toilet rooms and toilet compartments. All accessories shall be constructed of Type 304 stainless steel with a brushed finish unless otherwise noted.

1.8.2 Material and Performance Criteria

The contractor edited specification section shall include the following material physical characteristics and performance criteria for each of the toilet accessories listed below:

- A. <u>Toilet Tissue Holder</u>: Type II with two rolls of standard tissue stacked vertically with a tripping mechanism for automatically dispensing the stored roll upon depletion of the bottom roll. Cabinet shall have all edges radiused with no sharp corners, edges, or protruding surfaces. Vertical access door shall be flush with exposed paper roll face below. (Similar to BOBRICK model no. B-4888 for recessed and B-4288 for surface mount).
- B. <u>Sanitary Napkin Disposer</u>: Unit shall contain a removable, leak-proof receptacle for disposable liners. Fifty disposable liners shall be provided for each unit installed. Removable receptacle shall be retained in cabinet by tumbler lock. Unit shall include a door for inserting disposed napkins. (Similar to BOBRICK model no. B-353 for recessed and B-254 for surface mount.)
- C. $\underline{\text{Coat Hook}}$: Coat hook shall have two projections utilizing a 25 mm wide metal band with a maximum 80 mm projection to minimize eye-poke hazard. Hook shall be attached to a 50 mm square flange. Flange is attached to the mounting surface with hidden fasteners. (Similar to BOBRICK model no. B-682).
- D. <u>Grab Bars</u>: Grab bar shall be 18-gauge, 32 mm OD stainless steel. Lengths shall be indicated on the AE drawings. Exposed mounting flange shall have set screw mounting holes concealed on the lip of the flange. Installed bars shall be capable of supporting a 227 kg vertical load without coming loose and without obvious permanent deformation. Space

between wall and grab bar shall be 38 mm.

- E. <u>Soap Dispenser</u>: Shall be horizontal surface-mounted, liquid soap type. Tank holding capacity of 1.2 L. minimum with a corrosion-resistant all-purpose valve mechanism with O-ring seals. Dispenser shall include vandal-resistant mounting, a hinged, lockable filler top, and polycarbonate refill window. (Similar to BOBRICK model no. B-4112).
- F. Combination Paper Towel Dispenser/Waste Receptacle Units: Dispenser/receptacle shall be semi-recessed and shall have a capacity of 600 sheets of C-fold, single-fold, or quarter-fold towel. Waste receptacle shall be designed to be locked in unit and removable for service. Locking mechanism shall be tumbler key lock. Waste receptacle shall have a capacity of 45 L. Unit shall be fabricated of not less than 0.8 mm stainless steel welded construction with all exposed surfaces having a satin finish. Waste receptacle that accepts reusable liner standard for unit manufacturer shall be provided. Unit shall be equal in size and specifications to Bobrick model no. 3944.
- G. Framed Wall Mirror: Wall mirror shall have 6 mm thick No. 1 quality plate glass. Frame shall be 19 mm by 19 mm one-piece, roll formed Type 304 stainless steel angle with continuous integral stiffener. Mirror shall include a continuous integral stainless steel shelf.

1.8.3 Installation Criteria

The contractor edited specification section shall include the following installation criteria for all toilet accessories.

- 1.8.3.1 Single Occupancy Toilet Rooms
 - A. Toilet accessories for Toilet Room 110 shall have accessories mounted at adult standard heights and locations.
 - B. Toilet accessories for Toilet Room 111 shall have accessories mounted in locations and at heights for adults in accordance with the requirements of ADA.

1.8.3.2 Children's Toilets

A. Toilet accessories for Toilet Rooms 122, 123, 133, 134, 140, and 141 shall be mounted at heights in accordance with ADAAG and the narrative for toilet rooms found in specification Section 01014, INTERIORS.

-- End of Section --

SECTION 10500

LOCKERS

PART 1 GENERAL

1.1 SUBMITTALS

All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Manufacturer's data; AE.

Submit manufacturer's data and written specifications on lockers.

SD-04 Drawings

Drawings; AE.

Submit shop drawings showing layout, elevations and details of all lockers. Indicate materials and thickness.

SD-14 SD Samples

Manufacturer's finishes; AE.

Submit actual color chips a minimum of 150 mm by 150 mm of locker finish colors. Finish and color of all components shall match those specified in the drawings Interior Finish Materials Legend. Finish and color shall not be limited to manufacturer's standard finish selections but shall be standard or custom color as required to meet the project color requirements.

1.2 DELIVERY AND STORAGE

Deliver materials in manufacturer's original unopened containers. Provide blocking as required, store materials under cover and protect against damage.

1.3 SCHEDULING

Lockers shall not be assembled, installed and set in place until all interior room finishes and materials at the installation location have been applied or installed and are completely set or dry.

PART 2 PRODUCTS

2.1 METAL LOCKERS (LK-1)

Lockers shall be single or double tiered in quantities and locations as shown on the drawings. Lockers shall be wardrobe storage type, equal to Republic Storage Systems Lockers, "Quiet" model. All major steel parts shall be fabricated from mild, cold rolled steel, free from imperfections and capable of taking a high grade enamel finish. Standard equipment shall include two single prong wall hooks attached with two bolts for each hook component located on the interior side wall of each locker. Finish shall be baked-on enamel. Overall dimensions for all metal lockers shall be: 305 mm wide by 381 mm deep. Single tier metal lockers shall be 762 mm high. Double tier metal lockers shall be 1524 mm high.

2.1.1 Locker Body

All locker body components, tops, bottoms, sides, and backs shall be made of 24 gauge steel. Tops and bottoms shall have single flanges on all four sides. Backs shall be flanged on three sides. All nuts and bolts shall be zinc or cadmium plated.

2.1.1.1 Sloping Top

All two-tier locker units shall receive a continuous sloping top with slip joint splices, hip and valley ends and corners without exposed fasteners. All sloped top components shall be fabricated from 24 gauge steel.

2.1.2 Locker Doors

Door shall be 16 gauge steel, formed with a full channel shape on the lock bar side to fully conceal the lock bar, channel formation on the hinge side and right angle formations across the top and bottom. Locker doors shall include a minimum of 4 louver ventilation slots, top and bottom.

2.1.2.1 Locker Door Hinges

Provide two hinges for each door on the locker. Each hinge shall be 2 inches long, five knuckle tight pin type, securely welded to frame and secured to door with rivets.

2.1.2.2 Locker Door Latching Mechanism

Door latching device shall be a one-piece, pre-lubricated, spring steel latch completely contained within the lock bar, under tension, to provide rattle-free operation. The lock bar shall be pre-painted, double-channel steel construction. The lock bar shall be securely contained within the door channel by self-lubricating polyethylene guides that isolate the lock bar from metal-to-metal contact with the door. There shall be three latching points for lockers over 1066 mm in height and two latching points for all lockers under 1066 mm in height. The lock bar travel shall be limited by contacting resilient high-quality, elastomeric cushioning devices concealed inside the lock bar.

2.1.2.3 Recessed Handle

A non-protruding 14 gauge lifting trigger shall be provided for actuating the lock bar when opening the door. It shall be contained in a formed 20

gauge stainless steel pocket with exposed portion encased in molded ABS thermoplastic cover that provides isolation from metal to metal contact. The trigger shall be an integral part of the steel slide plate which transfers the lifting force to the lock bar. The stainless steel pocket shall contain a recessed mounting area for the various lock types available and also mounting for the number plate.

2.1.2.4 Locker Door Number Plate

Each door shall have a polished aluminum number plate with black background and etched aluminum numerals not less than 9.5 mm high. Plates shall be attached with pop rivets.

2.1.3 Door Frames

Door frames shall be 16 gauge steel formed into deep 25 mm face channel shapes with a continuous vertical door strike integral with the frame on both sides of the door opening. Cross frame members of 16 gauge channel shapes, including intermediate cross frame on double tier lockers shall be securely welded to vertical framing members to insure a square and rigid assembly.

2.1.3.1 Frame Hooks/Silencers

Frame hooks to accept latching shall be of heavy gauge steel, set close in and welded to the door frame. Continuous vertical door strike shall protect frame hooks from door slam damage. A soft rubber silencer shall be provided and securely installed on each frame hook.

2.1.4 Color

Locker colors shall match those indicated in the drawing Interior Finish Materials Legend and project colorboards.

2.2 WOOD LOCKERS (LK-2)

Wood lockers shall be a custom single tier locker in quantities and locations as shown on the drawings. Lockers shall be wardrobe storage type, equal to Classic Woodworking, Inc. "Classic QA" model. Overall dimensions shall be: 305mm wide by 457 mm deep by 1829 mm high.

2.2.1 Locker Interior

Interior and shelves shall be constructed of 13 mm stain resistant, high impact, high density, acrylic-coated, electron beam cured KorTron. Color shall be Champayne.

2.2.1.1 Locker Frames

Locker frames shall have all exposed edges reinforced with 19 mm by 22 mm solid hardwood, tongue and grooved and hot-glued to edge to provide solid lumber for hinge screws and locks. Shelves are secured into sides with full length dado, glued and stapled to prevent shearing of the shelf from undue pressure.

2.2.1.2 Hooks

Two brass finished double prong coat hooks side-mounted on all openings.

2.2.1.3 Venting

Venting shall consist of 19 mm by 260 mm vent space at the top and bottom behind door providing air flow. Champayne colored perforated vent screen attached to each shelf between doors for security.

2.2.1.4 Number Plates

Number plates shall consist of 38 mm aluminum disc with black numbers routed flush with door face.

2.2.1.5 Hinges

Steel hinges shall be MICO heavy duty, lifetime guaranteed, brass finished. Hinges shall be securely fastened to 19 mm solid hardwood face frame. Each door shall have three hinges.

2.2.1.6 Locks

Locks shall be heavy duty built-in combination locks with master key override. Five sets numbers to change combination.

2.2.2 Doors and End Panels

Doors shall be raised panel type. Doors shall be constructed of 19 mm solid wood, kiln dried FAS northern red oak. All style and edge joints are glued together. Faces shall have beveled edges. All door parts shall be precision machined with gap and rubber space tubing between inside panel and rails to allow for shrinkage and swelling. Side panels shall be red oak veneer on particleboard core, self edged.

2.2.3 Solid Wood and Wood Veneer Finish

All exposed and semi-exposed solid wood and wood veneered component surfaces shall be stained and finished utilizing a catalyzed polymer lacquer applied in two coats with hand sanding between coats.

PART 3 EXECUTION

3.1 FABRICATION (Wood Lockers)

All wood locker units shall be factory fabricated and assembled using dado or rabbet at all framing joints and shelves. Dado-glue and staple system shall be used to provide strength, stability, squareness, rigidity, and prevention of racking, twisting and warping.

3.2 INSTALLATION

Install lockers in areas indicated. Install in accordance with approved shop drawings and manufacturers recommendations. Fasten lockers together and then to walls and floor or floor base with minimum of two fasteners per locker and appropriate expansion anchors.

3.3 CLEAN-UP

Upon completion of installation, clean all surfaces. Touch-up all scratches and marks with touch-up paint provided by locker manufacturer.

-- End of Section --

DIVISION 11 – EQUIPMENT

11000: Outline Specifications

Government-Edited Guide Specifications:

11480 Athletic Wall Padding

SECTION 11000

DIVISION 11: EQUIPMENT - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

Contractor Edited Guide Specifications 1.1.1

The contractor shall edit and provide the following UFGS guide specifications for Division 11: EQUIPMENT:

Section 11400A, KITCHEN EQUIPMENT

Government Edited Specifications 1.1.2

The contractor shall incorporate the following government-supplied, fully edited specification sectios as part of the project design:

Section 11480, ATHLETIC WALL PADS

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 167	(1999) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
ASTM A 240	(2000) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip for Pressure Vessels

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 96 (1998) Ventilation Control and Fire Protection of Commercial Cooking Equipment

> SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA HVAC Duct Const Stds (1995; Addenda Nov 1997) HVAC Duct Construction Standards - Metal and Flexible

UNDERWRITERS LABORATORIES (UL)

UL 1046 (1979) Grease Filters for Exhaust Ducts (1995; Rev thru Apr 1999) Exhaust Hoods for Commercial Cooking Equipment

UL 710

1.3 SECTION 11400A, KITCHEN EQUIPMENT

The contractor edited specification section shall include the material physical characteristics, performance, fabrication, and installation criteria listed below for each equipment item.

1.3.1 Equipment Identification

Reference to item numbers listed in parentheses '()' after each equipment item type in this specification are provided to cross-reference to the government expanded kitchen plan and equipment layout, Drawing Sheet Nos. A8.1 and A8.2.

1.3.2 Source Selection

Manufacturers and model numbers for contractor supplied equipment shown in this document are provided to indicate minimum acceptable quality, performance, and function. They also indicate acceptable dimensions with respect to the equipment layout shown on the drawings. They are not intended to limit selection from other manufacturers provided they meet the criteria indicated.

1.3.2.1 Government Furnished and Installed Equipment

The contractor shall supply all necessary utility requirements and connectors to include gas, water, and electricity in locations as shown on the drawings for government furnished and installed kitchen equipment as follows:

- A. Mobile Food Warming Carts (Item A) existing.
- B. Undercounter Refrigerator (Item B) Reference Attachment No. 7.
- C. Range (Item C) Reference Attachment No. 8.
- D. Griddle (Item D) Reference Attachment No. 9.
- E. Double-Stack Convection Oven (Item E) Reference Attachment No. 10.
- F. Ice Machine (Item F) Reference Attachment No. 11.

Manufacturers and model numbers are provided for preliminary design purposes. Exact manufacturer, model number, and specifications for all government furnished, government installed equipment shall be provided to the Contractor by the User through the Government Contract Representative.

1.3.3 Mechanical and Electrical Connections

Equipment requiring mechanical and/or electrical connections shall be coordinated with the appropriate mechanical and electrical specifications and drawings to include specification Section 01016 MECHANICAL REQUIREMENTS, Section 15000, DIVISION 15000: MECHANICAL - OUTLINE SPECIFICATIONS, Section 01017, ELECTRICAL REQUIREMENTS, and Section 16000,

DIVISION 16000, ELECTRICAL - OUTLINE SPECIFICATIONS.

1.3.3.1 Backflow Preventors

Backflow preventors shall be provided wherever the possibility a cross-connect or interconnect between a potable water supply and any source of non-potable water or other contaminant could result in contaminating the potable water. Backflow preventors shall be as specified in Section 15000: DIVISION 15400A, PLUMBING, GENERAL PURPOSE.

1.3.3.2 Recessed Floor Sinks

Floor sinks, recessed into the floor slab, shall be provided at all equipment drains, including the walk-in freezer and refrigerator units, and indirect waste unless otherwise noted. Floor sinks shall be as specified in Section 15000: DIVISION 15400A, PLUMBING, GENERAL PURPOSE.

1.3.4 Fastening Devices

Fastening devices between equipment components, and to the floor and/or walls shall be of the same material as the metal being joined when joined pieces are of a similar material. Stainless steel fasteners shall be used whenever one of the materials is stainless steel.

1.3.5 Walk-In Freezer and Refrigerator (ITEM NOS. 1 AND 2)

1.3.5.1 General Description and Requirements

Walk-in units shall be composed of pre-fabricated, metal-clad, polyurethane-insulated panels and components to provide a self-contained unit composed of walls, ceiling, and floor equal in performance and specifications to units manufactured by W. A. Brown & Sons, Inc. Units shall be to custom fabricated to dimensions, configurations, and locations as shown on the government drawings. Finished ceiling height from the raised floor shall be a minimum of 2400 mm. Units shall be constructed in accordance with UL and NSF standards and shall bear their seals. Reference Attachment No.1 for manufacturers literature regarding this item.

1.3.5.2 Material and Performance Criteria

The walk-in freezer and refrigerator units shall include the following minimum requirements:

- A. <u>Panels</u>. Panels shall be 102 mm thick consisting of precision roll formed inner and outer metal pans separated by foamed-in-place rigid urethane insulation with tongue-and-groove edges.
 - 1) Panel edges shall have foamed-in-place flexible vinyl gaskets without glue or staples used for attachment.
 - 2) Panels shall be attached to each other by the use of a minimum of 3 cam-type locking assemblies formed-in-place a the time of fabrication on the interior panel face to include flush, stainless steel plugs for wrench holes.
 - 3) Panel insulation shall have a flame spread rating of 25 or less in accordance with ASTM E-84 and certified with a UL label.
 - 4) Thermal conductivity factor (K) shall not exceed 0.02 watts

per meter, per degree kelvin.

- 5) Overall coefficient of heat transfer (U-factor) shall not be more than .187 watts per square meter, per degree kelvin for 100 mm walls.
- 6) The insulation R-factor shall have a value of R-5.28 square meter, degree kelvin per watt.
- 7) All interior wall, ceiling, floor, and exposed exterior wall panel surfaces shall be $0.8\ mm$, type $304\ stainless$ steel with a No. 4 finish.
- B. $\underline{\text{Doors}}$. Doors shall be flush, located, and hinged as shown on the RFP $\overline{\text{drawings}}$.
 - 1) Door face construction and finish shall match the wall panels.
 - 2) Door opening shall be 914 mm wide by 2134 mm high.
 - 3) Door hardware shall be heavy-duty type in brushed chrome finish consisting of 3 cam lift hinges, latch, and an OSHA-approved, inside safety release handle.
 - 4) Door shall be fitted with a minimum 305 mm square, triple pane, view port with heated glass and frame.
 - 5) Doors and door jambs shall utilize a vinyl gasket with magnetic core. Door bottom shall have a flexible double wiper gasket.
 - 6) Door panel shall be equipped with a digital thermometer, light switch with neon pilot light, and positive door closer on the exterior face.
 - 7) Door stops shall be provided.
 - 8) A pressure release vent shall be provided for the freezer.
 - 9) Door jambs shall be equipped with perimeter anti-condensate electric heater and fabricated of RFP for high-impact resistance.
 - 10) A heavy-duty 14 gauge C-channel of "ADDISON POWER H BRACE" style construction shall be foamed in place around entire door opening to secure hardware and prevent warping and racking.
- C. $\underline{{\sf Floor\ Panels}}$. Urethane-filled floor panels shall be 108 mm thick, formed from 24-gauge galvanized steel and shall include a 2.54 mm thick aluminum treadplate top surface. Construction shall withstand a uniformly distributed load of 3662kg per square meter.
- D. <u>Thresholds</u>. Threshold from building floor to raised refrigerator floor shall incorporate an interior/exterior ramp with anti-skid strips. Ramp length shall be evenly distributed between the interior and exterior of the walk-in unit.
- E. <u>Lighting</u>. Each walk-in unit shall include interior, ceiling mounted, incandescent lighting capable of providing a minimum 2 watts per square foot distributed evenly light. Fixture shall be furnished

with a 100W bulb and a coated shatterproof globe with wire cage. The fixture shall be field wired with conduit and wiring extended on the top exterior of the walk-in unit and connected to a thru-ceiling junction box. All electrical penetrations shall be sealed.

- F. <u>Trim Strips</u>. Installation shall include 22-gauge stainless steel trim strips to close the gap between the walk-in unit and building walls and ceiling. Trim strips shall extend from floor to ceiling and wall-to-wall with no visible fasteners.
- G. <u>Emergency System</u>. Each walk-in unit shall include an emergency signal system that consists of a buzzer alarm on the exterior of the refrigerator unit that can be activated from inside both units.

1.3.6 Refrigerator/Freezer/Dry Storage Shelving Units (ITEM NO. 3)

1.3.6.1 General Description and Requirements

The walk-in refrigerator, walk-in freezer, and dry storage room shall include shelving units. All shelving components to include posts, shelves, shelf supports, and hardware shall be Type 304 stainless steel. Construction shall be in accordance with the latest requirements of NSF Std. No. 2 and shall bear the NSF label.Units shall be securely fastened to the floor, walls, and ceiling as necessary to provide a completely stable installation and eliminate any possibility of tipping. Shelving units shall be custom fabricated to lengths and in locations as shown on the drawings.

1.3.6.2 Material and Performance Criteria

The shelving units shall include the following minimum requirements:

- A. Units shall be approved by the manufacturer for use in refrigerated environment.
- B. Unit lengths shall be standard and/or customized in combinations and quantities as necessary to provide the entire overall lengths shown on the government drawings.
- C. All shelving units shall be 457 mm deep.
- D. Shelving units shall be floor to ceiling models with shelves adjustable in a maximum of 50 mm increments.
- E. <u>Shelves</u>. Shelves shall be fabricated in an open wire configuration. Solid stainless steel wire rods and cross supports shall be of a size sufficient, and with support brackets in quantities and locations, to support a minimum of 2.1 Kg per square meter without noticeable deflection.
 - 1) Each unit shall include a minimum of 4 shelves spanning the entire width of the unit.
 - 2) Maximum clearance between wire rods shall be 25 mm.

1.3.7 Condensing Unit (ITEM NO. 4)

1.3.7.1 Material and Performance Criteria

Each walk-in shall have a condensing/evaporation unit and shall be from the same manufacturer as the walk-in units they will serve. Units shall be located on a concrete pad on the exterior of the building. Units shall be sized in accordance with the volume of space to be conditioned and the temperatures to be achieved.

1.3.8 Countertop Units (ITEM NOS. 5, 6, 7, 8, 9, AND 10)

1.3.8.1 General Description and Requirements

Each unit shall consist of a countertop, integral back and side splashes, leg assemblies, framing supports, under-counter shelving surfaces, gussets, and mounting hardware. All components shall be stainless steel and shall be nonmagnetic, ASTM A 167 or ASTM A 240: 18-8, 300 Series, austenitic, polished No. 3 or brushed No. 4 finish on all exposed surfaces. Construction of all components shall be in accordance with the latest requirements NSF Std. No. 2 and shall bear the NSF label.

1.3.8.2 Material and Performance Criteria

The countertop units and their components shall include the following minimum requirements:

- A. Countertops: Countertops shall be custom fabricated to dimensions as shown on the drawings or approved similar layout, constructed of 14 gauge stainless steel (unless otherwise noted) with all seams and corners welded, ground smooth, and polished. All countertop free edges of the countertop shall be formed in one of the following methods:
 - 1) Countertop Item Nos. 5, 6, 7, and 8. All front edges shall utilize a "turned down" profile consisting of 51 mm at 90 degrees on a with a 19 mm tight hem at the bottom. Free edges shall be rounded on a 19 mm radius.
 - 2) Countertop Item Nos. 9 and 10. All front and side edges shall utilize a "rolled rim" profile consisting of an integral edge coved up 51 mm with 38 mm wide rim rolled 180 degrees and turned down to counter top 102 mm. Edges shall be hemmed 19 mm and corners bullnosed.
- B. Back and Side Splashes: All stainless steel countertops shall have an integral coved backsplash and shall be formed to one of the following profiles:
 - 1) Countertop Item Nos. 5, 6, 7, and 8. Coved up 152 mm at 90 degrees on a 16 mm radius and sloped back 64mm at the top on a 45 degree angle. Turned down 25 mm at 135 degree angle at the rear of the splash with ends closed to the bottom of the top turn down. Splash turn down shall be secured to wall with 102 mm long, 14 gauge stainless steel "zee" clips anchored to the wall, 914 mm on center. Side splashes shall match backsplash but be 51 mm in height.
 - 2) Countertop Item Nos. 9 and 10. Coved up 254 mm and sloped back 64 mm at the top on a 45 degree angle. Turned down 25 mm at 135 degree angle at the rear of the splash with ends closed to the bottom of the top turn down. Splash turn down shall be secured to wall with 102 mm long, 14 gauge stainless steel "zee" clips anchored to the wall, 914 mm on center. Side splashes shall match

backsplash in height.

- C. Under Counter Shelving: All under counter space shall be utilized to the maximum extent possible for storage incorporating a single shelf the full width of the countertop. Additional criteria and requirements are as follows:
 - 1) Under counter shelving shall be constructed of 16 gauge stainless steel with all front and side edges turned down 38 mm at 90 degrees with a 19 mm tight hem at the bottom. Back of shelf shall be turned up 102 mm with a 19 mm coved radius.
 - 2) Shelving corners shall be notched a full 90 degrees and welded from underside to completely fill the gap, ground and polished.
 - 3) Undershelf shall be braced with a minimum 25 mm by 102 mm, 14 gauge stainless steel channel at longitudinal centerline and between each intermediate pair of legs.
- D. Framing & Support: Framing support components shall be fabricated from 25mm by 25 mm 12 gauge stainless steel. Intermediate supports shall be provided 610 mm O.C. throughout the length of the countertop.
- E. Sound Deadening: All countertops shall utilize a 13 mm wide rope sealant positioned continuously between all contact surfaces of the frame members and the underside of the countertop for sound-deadening.
- F. Leg Assemblies: Legs and cross rails shall be of 16 gauge, 41 mm OD stainless steel tubing. Legs shall be continuously welded to gussets, channels, or angles as specified. In addition, leg assemblies shall:
 - 1) Feet shall be sanitary, die-stamped stainless steel bullet-shaped, fully enclosed and shall provide a 25 mm adjustment without threads being exposed. Bottom of legs shall be finished and overlapped stem to provide a sanitary, closed fitting.
 - 2) Feet for free-standing fixtures requiring utility connections shall be as above except with a flanged plate at the bottom which shall be anchored to the floor with noncorrosive bolts.

1.3.9 Work Sinks (ITEM NO. 11)

1.3.9.1 General Requirements

Unless otherwise noted all work sinks within countertops shall be to dimensioned as shown on the government drawings and conform to the applicable requirements of NSF Std 2.

- A. Material and Performance Criteria: Unless otherwise noted, additional requirements shall include:
 - 1) Minimum 14-gauge stainless steel construction.
 - 2) Vertical and horizontal corners rounded to not less than 19mm radius.
 - 3) 19mm double walls at all partitions.

- 4) Continuous 14-gauge stainless steel exterior filler panels shall be provided between sink compartments of multi-compartment sinks and shall be ground smooth and polished to match the adjacent surfaces.
- 5) Bottoms scored and sloped toward drains and edges shall be rimless to countertop surface.
- 6) Equipped with waste and overflow fittings and drain plugs with quick-opening valves.
- 7) Each sink shall have a faucet set as described below unless otherwise noted:
- a) Faucets shall be mounted on the countertop back splash with exposed body and concealed supply connections.
- b) Spout shall be swing-type approximately 200mm in length and spout outlet shall be a minimum of 120mm above the rim of the sink.
- $\ensuremath{\mathtt{c}}\xspace)$ Valves shall have indexed metal lever handles and replaceable seats.
- d) Kitchen faucets shall meet the requirements of NSF 61, Section 9.
- e) Valves shall have indexed metal lever handles and replaceable seats.

1.3.10 Hand Sink (ITEM NO. 12)

1.3.10.1 General Description and Requirements

Hand sinks shall be dimensioned and located as shown on the RFP drawings. Hand sinks shall be wall-mounted without floor support. Hand sink shall be equal in performance, function, features, dimensions, and construction to Elkay Model No. CHS-1716-C. Reference Attachment No. 2 for manufacturer's product literature and data.

- A. Material and Performance Criteria: Hand sinks shall include the following minimum requirements:
 - 1) One piece deep drawn heavy gauge stainless steel with all vertical and horizontal corners coved.
 - 2) Overall dimensions shall be a minimum $430~\mathrm{mm}$ long by $380~\mathrm{mm}$ wide with a sink compartment size of $350~\mathrm{mm}$ by $250~\mathrm{mm}$ by $120~\mathrm{mm}$ deep.
 - 3) Integral 195 mm high backsplash with a 51 mm turn back on a 45 degree angle.
 - 4) Provide stainless steel skirt on front and sides.
 - 5) Installation height shall be 864 mm at rim height.
 - 6) Hand sinks shall have two openings in the backsplash at 102mm on center to support a standard faucet with wrist action lever

handles and a swivel gooseneck spout with aerator.

- 7) Equipped with a 38 mm stainless steel basket drain, a lever operated drain with built-in overflow.
- 8) Sink accessories shall include:
- a) Wall-mounted stainless steel paper towel dispenser designed to dispense "C" fold paper towels.
- b) Wall-mounted liquid soap dispenser located over the sink unit.

1.3.11 Dishwasher (ITEM NO. 13)

1.3.11.1 General Description and Requirements

Dishwasher shall be a door model equal in performance, function, features, dimensions, and construction to Hobart Model No. AM14 with "right-to-left" operation. Reference Attachment No. 3 for manufacturer's product literature and data. Dishwashing function shall include stainless steel counters with dimensions, including counter height, to coordinate with the dishwasher to provide a smooth loading and unloading operation.

- A. Construction and Performance Requirements: The dishwasher shall include the following minimum construction and performance criteria:
 - 1) Electric Heated.
 - 2) Shall include electric booster heater option. The booster heater shall:
 - a) Be adequately sized to boost 49 degree C inlet water temperature to 82 degree C.
 - b) Include pressure/temperature relief valve and pressure gauge for incoming water.
 - 3) 16-gauge stainless steel construction.
 - 4) Spring-loaded, counterbalanced, guided doors with chrome plated handles.
 - 5) Minimum 605 Liters per minute pump capacity.
 - 6) Microcomputer control system in single housing mounted on the side of the dishwasher, field adjustable height.
 - 7) Maximum 62 second cycle to include wash, dwell, and 2 rinse cycles.
 - 8) High efficiency self-draining pump.
 - 9) Door cycle switch. Automatically starts wash cycle timer program when doors are closed.
 - 10) Automatic temperature control and positive low-level water protection.

- 11) Interchangeable upper and lower level wash and rinse stainless steel arms.
- 12) Removable stainless steel, self-flushing strainer pan and scrap basket.
- 13) Automatic drain shut-off.

1.3.11.1 Accessories

Dishwasher shall include a minimum of 6 each molded, all plastic construction racks of appropriate dimensions to fit the dishwasher. Rack configurations shall accommodate and be designed to hold dishes, flatware, utensils, silverware, cups, glasses, and cafeteria-type trays.

1.3.12 Pre-Wash Sink/Foodwaste Disposer Unit (ITEM NO. 14)

1.3.12.1 General Description and Requirements

The unit shall be located in the countertop to the right of the dishwasher. Unit shall be equal in performance, function, features, dimensions, and construction to Hobart Model No. FD3-300. Reference Attachment No. 4 for manufacturer's product literature and data.

- A. Construction, Performance, and Functional Criteria: The pre-wash sink and waste disposer unit shall include the following minimum requirements:
 - 1) Food Waste Disposer Component. The food waste disposer unit shall include:
 - a) 3 H.P., 3 phase, 60 Hz., motor with manual reset thermal overload and permanently lubricated ball bearings.
 - b) NEMA 12 wall mounted electrical control box enclosure containing magnetic contactors, pushbutton start and stop, solenoid valve, and automatic reversing.
 - c) Heavy aluminum grind and discharge housings.
 - d) Vinyl isolating mounting ring.
 - e) $38\ \text{mm}$ chrome plated brass tailpiece for connection to standard drain trap.
 - f) Dual directional grinding capability.
 - 2) <u>Sink Cone</u>. Stainless steel sink in the shape of a cone recessed in the countertop specifically designed for attachment to the waste disposer. The sink cone and components shall include:
 - a) $\,$ 380 mm inside diameter sink cone with hole for water swirl inlet.
 - b) Vacuum breaker.
 - c) Water Swirl Inlet. 13 mm N.P.T.
 - d) Pre-Rinse Spray Assembly. Equal to Hobart model no.

PR-3 Utility Spray. Assembly includes backsplash mounted faucet assembly and flexible metal-encased 914mm long hose with adjustable spray head.

e) Vinyl silver-saver splash guard ring.

1.3.13 Scullery [Pot/Pan Wash] Unit (ITEM NO. 15)

1.3.13.1 General Description and Requirements

The scullery sink unit shall be a pre-fabricated, self-contained unit consisting of 3 sink tanks, two faucet sets, drain boards, and a wash sink heater. Unit shall be UL-Listed in accordance with NSF Standard No.2 and shall be certified to CSA Standard with labels affixed. Unit shall be dimensioned and located as shown on the RFP drawings. Unit shall be equal in performance, function, features, dimensions, and construction to Hobart "TurboWash" model. Direction from soiled to clean end shall be left to right. Reference Attachment No. 5 for manufacturer's product literature and data.

- A. Construction and Performance Criteria: The scullery sink unit shall include the following minimum criteria:
- 1) Unit shall be constructed of 14 gauge, Type 304 stainless steel.
- 2) Unit shall have an 280 mm high by 64 mm deep back splash and front trim panel.
- 3) Unit shall include removable, welded H-frame leg sets, adjustable bullet feet, and detachable/adjustable height cross rails.
- 4) Wash sink shall contain:
 - a) Centrifugal pump with $102\ \mathrm{mm}$ diameter intake and $76\ \mathrm{mm}$ diameter outlet.
 - b) 2 H.P. totally enclosed (TEFC) wash pump motor with permanently sealed bearings.
 - c) Thermal overload and low water protection for water pump.
 - d) 8 each 38 mm diameter wash nozzles.
 - e) Automatic motor overload reset.
 - f) 2.5 KW wash sink heater with high temperature and low water protection. Includes heat selector switch for off, normal (46 degrees C), and high (60 degrees C) settings.
 - g) Dual inlet strainer.
 - h) 305 mm by 305 mm by 78 mm deep, high volume wash sink sump with removable basket strainer.
 - i) Pre-rinse faucet/spray assembly with 13mm hot and cold water connections to be mounted on the back splash, centered on

the wash sink. Assembly includes a spray assembly equal to Hobart model no. PR-4.

- 5) Unit shall include a high-quality mixing faucet set mounted to the backsplash to service the rinse and sanitizer sinks.
- 6) Drain boards shall be scored and slope toward the sinks.

1.3.14 Vegetable Preparation Unit (ITEM NO. 16)

Unit shall consist of two sink compartments with stainless steel counters on each end of the unit. Location and dimensions shall be as shown on the RFP drawings.

1.3.14.1 General Description and Requirements

- A. Construction and Performance Criteria: The vegetable preparation unit shall include the following minimum criteria:
 - 1) Unit shall be constructed of 14 gauge, Type 304 stainless steel. Construction shall be in accordance with the latest requirements of NSF Std. No. 2 and shall bear the NSF label.
 - 2) Unit shall have an 280 mm high by 64 mm deep back splash and front trim panel.
 - 3) Unit shall include removable, welded H-frame leg sets, adjustable bullet feet, and detachable/adjustable height cross rails.
 - 4) Backsplash mounted faucet assembly shall include a separate sprayer/rinse head or an adjustable head which produces both spray and stream.
 - 5) Countertops shall have a rolled rim edge coved up 76 mm with a 38 mm wide rim rolled 180 degrees and turned down to the countertop; hem edges, and bullnose corners. Countertops shall slope toward sinks.
 - 6) The lefthand sink shall include a foodwaste disposer as specified in paragraph 1.3.18, item no. 20.

1.3.15 Condensate Hoods (ITEM NO. 17)

1.3.15.1 General Description and Requirements

Hood and duct work systems shall conform to ACGIH-2092M , SMACNA HVAC Duct Const Stds, and NFPA 96. Hoods over dishwashing machines and the rinse compartment of pot washing sinks shall be located and provided to dimensions as shown on the government drawings. Vent hood shall be wall or ceiling mounted and exhaust through the ceiling. Minimum unit performance and utility requirements shall be detailed in specification Section 01016, MECHANICAL, and Section 01017, ELECTRICAL. Supply and installation of exhaust fans for food service equipment and exhaust hoods shall be as specified in Section 15895A, AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

A. Construction and Component Requirements: The exhaust system shall

include the following minimum requirements:

- 1) Bottom of the hood shall be 1980~mm above the finished floor or as recommended by the manufacturer to achieve maximum performance.
- 2) Construction shall be in accordance with the latest requirements of NFPA Bulletin No. 96 and NSF Std. No. 2 and shall bear the NSF label.
- 3) Unit shall be constructed of 18-gauge Type 304 stainless steel with No. 4 finish.
- 4) Hood shall include a removable condensate baffle constructed of 18-gauge stainless steel.
- a) Baffle shall be pitched to drain into a full perimeter welded condensate collecting gutter with a 25mm N.P.T. stainless steel drain fitting at the rear corner.
- b) Provide wall mounted drain pipe from fitting to floor sink.
- 5) Welded duct collar shall be centered in the top of the hood and sized to required performance and equipped with stainless steel balancing damper.
- 6) Ducts at dishwashing machines shall consist of two vertical ducts, one at each end of the dishwasher. The intake of each duct shall be at the top edge of the dishwasher and the ducts shall extend to 150 mm above the finished ceiling for final connection. The exhaust outlet shall be connected to the exhaust system.
- 7) Provide stainless steel closure channels and trim as necessary to close gap between the top of the exhaust hood and the finished ceiling.

1.3.15.2 Make-Up Air

The air volume which is exhausted from a kitchen shall be replaced as required by NFPA 96. Make-up air diffusers shall be provided exterior, the full length of the front panels, at both sides of the hood producing a low velocity discharge. The supply air plenum shall have 25 mm thick foil-faced fiberglass insulation at interior of plenum. The temperature differential between make-up air and the air in the conditioned space shall not exceed 5 degrees C, except air that is part of the air conditioning system or air that does not decrease comfort conditions of the occupied space.

1.3.16 Exhaust Hoods Over Cooking Equipment (ITEM NO. 18)

1.3.16.1 General Description and Requirements

Ceiling mounted, stainless steel, exhaust hood shall conform to ACGIH-2092M, NFPA 96, and SMACNA HVAC Duct Const Stds. Hoods shall be U.L. listed per UL 710 and NSF approved. Minimum unit performance and utility requirements shall be detailed in specification Section 01016, MECHANICAL, and Section 01017, ELECTRICAL. Supply and installation of exhaust fans for food service equipment and exhaust hoods shall be as specified in Section 15895A,

AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

1.3.16.2 Construction and Component Requirements

Hoods shall be of the canopy and filter type. Non-canopy type hoods shall pronot be provided. Grease extracting type hoods shall pronot be provided. The exhaust system shall include the following minimum requirements:

- A. Unit shall be custom fabricated to dimensions as shown on the government drawings.
- B. Each exhaust hood system that serves cooking equipment, associated exhaust hood system ducts, and all cooking equipment served by the exhaust hood system shall be protected with a wet chemical fire extinguishing system. The wet chemical fire extinguishing systems shall be in accordance with Section 13965A WET CHEMICAL FIRE EXTINGUISHING SYSTEM.

1.3.16.3 Integral Make-up Air System

Hood shall be provided with an integral make-up air system which automatically replaces the air volume that is exhausted by the hood. The make-up air system shall be in accordance with NFPA 96. Make-up air diffusers shall be provided at the front panel and at the exterior length of the hood producing a low velocity discharge. The supply air plenum shall have a 25 mm thick foil-faced fiberglass insulation at the interior of the plenum. The temperature differential between the make-up air and the air in the conditioned space shall not exceed 5 degrees C, except for air that is part of the air-conditioning system or air that does not decrease comfort conditions of the occupied space.

1.3.16.4 Hand Held Fire Extinguishers

Hand held fire extinguishers shall be located at each exhaust hood and shall be suitable for gas, electric, and grease fires.

1.3.16.5 Canopy Hoods

Canopy hoods shall completely cover the cooking equipment. The hood shall overhang the cooking equipment a minimum of 150 mm at each end and 300 mm in front of the equipment. Exhaust air volumes for hoods, wall or double island type, shall be a minimum of 0.51 cubic meter per second per square meter of suction opening, to provide for capture and removal of grease-laden cooking vapors. Test data or performance acceptable to the authority having jurisdiction over both shall be provided and displayed.

1.3.16.6 Grease Filters

Grease filters shall be in accordance with UL 1046. Filters shall remove heat, odor, smoke, residue, and grease vapors from the exhaust of the applicable cooking process. Filter design shall result in optimum air velocity for the removal of residues and grease. Construction shall be stainless steel in an overlapping staggered arrangement to restrict the passage of flame upstream of the filter media.

1.3.17 Wall Mounted Shellving (ITEM NO. 19)

1.3.17.1 General Description and Requirements

Wall-mounted stainless steel shelving units shall be composed of shelf surface, framing supports, and angled wall brackets. All components shall be stainless steel.

- A. Construction and Fabrication Requirements. The wall mounted shelving shall include the following minimum requirements:
 - 1) Units shall be custom fabricated to dimensions, profiles, and in quantities as shown on the government drawings. Construction shall be in accordance with the latest requirements of NSF Std. No. 2 and shall bear the NSF label.
 - a) Shelf depth shall be 305 mm at all locations.
 - 2) Shelf component shall be constructed of 14 gauge stainless steel.
 - 3) Integrally coved back and sides shall be turned up 102 mm at 90 degrees on a 16 mm radius. Top edge of backsplash and end splashes shall be feathered and ground smooth in a bullnose profile to eliminate sharp edges.
 - 4) All front edges shall utilize a "turned down" profile consisting of 51 mm at 90 degrees with a 19 mm tight hem at the bottom. Free edges shall be rounded on a 19 mm radius.
 - 5) Perimeter and intermediate framing support shall be constructed of 25 mm by 25 mm 12 gauge stainless steel and welded to angled wall supports.
 - 6) Angled wall bracket shall be fabricated from 12 gauge stainless steel. Vertical bracket component shall include integrally radiused 50 mm horizontal top and vertical back flanges. Top flange shall be welded to the shelf framing support. Back flange shall be bolted to the wall with a minimum of 2 stainless steel toggle bolts per bracket.
 - a) Maximum distance between brackets shall be 1500 mm.
 - b) End brackets shall be located and inset 150 mm from the shelf ends.

1.3.18 Foodwaste Disposer (ITEM NO. 20)

1.3.18.1 General Description and Requirements

The unit shall be installed at the drain location for the lefthand sink in the vegetable preparation unit (item no. 16). Unit shall be equal in performance, function, features, dimensions, and construction to Hobart Model No. FD3-75. Reference Attachment No. 6 for manufacturer's product literature and data.

- A. Construction, Performance, and Functional Criteria. The foodwaste disposer unit shall include the following minimum requirements:
 - 1) 3/4H.P., 3 phase, 60 Hz., motor with manual reset thermal overload and permanently lubricated ball bearings.
 - 2) NEMA 12 wall mounted electrical control box enclosure

containing magnetic contactors, pushbutton start and stop, solenoid valve, and automatic reversing.

- 3) Heavy aluminum grind and discharge housings.
- 4) Vinyl isolating mounting ring.
- 5) 38 mm chrome plated brass tailpiece for connection to standard drain trap.
- 6) Dual direction grinding.

1.3.18.2 Installation Requirements

The sink unit shall include all necessary drain opening dimensions and fittings for a secure, watertight installation of the foodwaste disposer.

1.3.19 Food Waste Disposer (ITEM No. 21)

The food waste disposer unit shall be a first quality residential unit similar to KitchenAid model no. KCDS250X with the following minimum features and requirements:

- A. Instant energy 1-HP Capcitator-start motor.
- B. Wall Switch start method.
- C. Continous feed system with anti-jam reversing action.
- D. Polystyrene sound barrier.
- E. Corrosion-resistant drain chamber guard and stainless steel grind chamber.
- F. Manual reset overload protector.
- G. 7-year full warranty.

-- End of Section --

W.A.Brown & Son, Inc.

How to Specify your New Walk-In Cooler or Freezer.



Volume 1, Issue 1

Summer, 2001

Considering a new Walk-In???

So, you have decided to purchase a new walk-in. Whether you are an old pro at equipment specifying or brand new, taking a few minutes now to review your specific needs will certainly save you time and money in the future. And you will be significantly more pleased with your walk-in because you have taken the time up front to determine your needs both for today and the future.

The first step in properly specifying your walk-in cooler or freezer is to determine the size you require, how you will use it and where it will be located.

Make a list of all goods to be stored, case sizes, and maximum quantity of goods to be on hand that need to be stored in your walkin. Be sure you list all products to be stored, the case dimensions and the number of cases to be stored at any one time. Remember to consider your deliveries and the fact that on certain days (such as delivery days) you will need considerably more cold or frozen food storage. On this list indicate whether the goods are to be refrigerated or frozen. Of great importance when holding frozen food,



is the proper temperature you wish to hold the food. Some products can be safely held at 0 degrees Fahrenheit while others require temperatures as low as -20 degrees.

If your requirements call for a cooler and freezer, will they be in the same location or in different locations? Placing your freezer adjacent to or behind your cooler will keep your operating costs lower, because when the freezer door is open, it will open into the cooler, and not open to the heat of the kitchen. Thus less cold air will escape, reducing the load on the refrigeration system.

Will your walk-ins be placed indoors or outdoors? Outdoor additions save valuable indoor space, but may cause other operational considerations and may require cutting doors from your existing building.

Specification Points...

Will your walk-in be used as part of your visual-merchandising program? If you are going to have your customer base see your walk-in, you may wish to have a lot of windows or sliding doors in the side of your cooler.

Is there an existing refrigeration source?

Does your facility have existing refrigeration system that could power your new walk-in? If you do have an existing refrigeration source, how far is it located from the proposed walk-in? The farther away the refrigeration system is, the more temperature losses you will experience simply due to the law of physics. What are the specifications of any existing system?

Inside this issue:

Electrical, Refrigeration, Floors	2
Shelving, Doors	3
Delivery Options	4
Outside Units, Finishes Avail.	5
Work Sheet	6
Specification	7-8

Special points of interest:

- Determine the size of unit you require.
- Specify the accessory group that best meets your needs.
- Decide where the unit will be located and how it will be used
- Your specification can be given to any dealer or manufacturer to develop a quotation.

Here is a check list to help you arrive at the correct size for your walk-in.

Floor Construction

Will you be storing extra heavy items in the walk-in such as beer kegs? While most walk-in's can accommodate up to 600 pounds per square foot of weight, some items might weigh more than that. Now is the time to consider a reinforced floor, rather than after your walk-in has been assembled. Reinforced floors can carry loads up to 1000 #/ft.sq.

Will suppliers using a two-wheeled hand truck make deliveries directly to your walk-in? Consider a ramp or recessed floor to accommodate this type delivery. There are several



choices in ramps: interior, exterior & combination ramps are available. A Thin-line (two inch) floor is now available for a limited amount of installations. Call W.A.Brown for details to see if it will work in your particular situation. On what type of floor will the walk-in be constructed? Will it be Wood, Concrete, or Tile? Each type floor has its own advantages and disadvantages. W. A. Brown will supply a modular, insulated floor from our factory. All freezers require a floor, due to the insulating properties needed. Coolers can be ordered with or with-



Beer Kegs are Extra Heavy

out an insulated floor. In cases where you will be providing the floor, make sure the existing floor is insulated. Will the existing floor handle the weight of the walk-in box when it is fully leaded?

Some floors are constructed of smooth mill aluminum, others of Diamond Aluminum Treadplate which resists slipping and aids traction and safety. Most manufacturers offer the Treadplate as an option if not a standard.

Sizing your Refrigeration System



Remote or Self-Contained Refrigeration Used?

Electrical & Plumbing Considerations...

What electrical power is readily available? You will need to know the voltage, phase, and amperage. Voltage in new construction is normally 208V. However in a remodel situation, you may find 208V or 240V (220-240v) or perhaps even 480V. This voltage can be in single or three phase (1 or 3 phase). It is important to know what type voltage, phase and amperage you have available to properly set up your refrigeration system. Some smaller systems operate on 120V, but do not count on this for walk-in units above 4'x5'.

Is there a floor drain available? Refrigeration systems generate condensate water, which must be drained. Some systems offer a "hot gas" evaporative system which eliminate the need for drains. However, at this time, those systems are only available on the smaller refrigeration systems. If a drain is not close by, you will need to provide one.

Sizing your refrigeration is best handled after sizing the box itself. In general, systems are provided as Self Contained or Remote. Refrigeration systems produce a certain amount of heat, noise and condensation. You may decide you wish those by-products to be remote from your kitchen. However, the trade-off for this is additional expense. If you use this option, be sure to determine the length of run to the walk-in in advance. Top and side mounted units require space adjacent to the boxes. Remote refrigeration units can be utilized.

What is the frequency of your deliveries? What is the frequency of the opening and closing of your walk-in door? Both of these can require you to add additional refrigeration capacity to overcome the loss of cold temperatures and the intrusion of heat.

If food product is put away hot, consider increasing the size of refrigeration unit If the walk-in door is open a great deal during the day, discuss increasing the size of your refrigeration unit with your dealer. You may also wish to consider purchasing an air curtain or strip door do mitigate stress on the refrigeration unit.

What is the ambient room temperature of the adjacent areas to your walk-in? Obviously the higher the ambient temperature, the more refrigeration will be required. Many times the walk-ins are required to be adjacent to the cooking battery, where the normal temperature is above 85 degrees. All of these issues should be considered when sizing your refrigeration system.

How to Specify your New Walk-In Cooler or Freezer.

Page 2



General Specifications

Walk-in Coolers and Freezers shall be designed with modular panels to facilitate easy assembly and disassembly for relocation and for the expansion of the coolers or freezers if required by customers. The prefabricated, sectional constructed panels shall be metal clad.

PREFABRICATED PANEL CONSTRUCTION

- The panels shall consist of interior and exterior metal skins predisely formed with steel dies and roll-form equipment and thoroughly checked with gauges for uniformity and accuracy. The Insulation shall be "Foamed-In-Place" rigid urethane and when completely heatcured, shall bind tenaciously to the metal skins and form a ridged four (4) inch thick insulated panel. The urethane insulation must also adhere to the cam-action locking devices. All panels shall have 100% "Foamed-In-Place" urethane insulation and have no internal wood, metal or high density urethane structural members. To insure that all joints are air tight and vapor proof all panel edges must have a "Foamed-In-Place" double tongue and groove edge on all sides which are of the same density as the rest of the panel. A flexible vinyl gasket which is also "Foamed-In-Place" shall extend around the interior and exterior perimeter of each male edge. This gasket shall not be glued or stapled in place. Gaskets shall be resistant to damage from oil, grease, water, detergents and sunlight, and must be NSF Approved and shall be flame retardant.
- 2.2 Wall panels shall be made in 11-1/2", 23" and 46" widths.
- 2.3 Door panels shall be in 46", 57-1/2" or 69" widths.
- Corner panels shall measure either 11-3/4* X 11-3/4*, 11-3/4* X 23-1/2*, or 23-1/2* x 23-1/2*. The corners shall be a precise 90 degree angle to assure maximum strength and perfect alignment.
- 2.5 Floor panels shall measure 23*, 35*, 46* or 46-1/2* wide. The floor sections shall be made to support a uniformly distributed load up to and including 750 lbs. per square foot.
- When a floor is not specified the walk-in shall be supplied with an extruded PVC insulated floor screed. This screed shall match the double tongue and groove design of the wall panels and must cam and lock securely. A PVC panel track is also used for Quick Set applications.
- 2.7 All panels are to be interchangeable for fast and easy installation.

3.0 CAM LOCKS

- Cam-action locking devices shall be accurately and precisely positioned in the panels to assure a positive joint. Where wall panels are joined together there shall be a minimum of three (3) locking devices. These locking devices shall consist of a camaction rotating locking arm in the tongue edge. This locking arm shall engage a steel rod which is firmly anchored in the groove edge. This action will draw all tongue and groove joints firmly and tightly together. Each section of the locking device shall have sufficient surface to assure rigid anchoring. The locking device shall be bonded in the urethane foam without need of additional anchorage arrangements. Both the locking arm and the steel rod shall be housed in steel pockets and "Foamed-In-Place". The steel pockets shall have a flange on each side to give additional binding strength.
- All locking of standard sections shall be performed from the interior by means of a hex wrench which is furnished by the manufacturer with the cooler or freezer. The wrench holes shall be recessed and covered with a stainless steel or white plug button. The plug buttons shall be flush with the metal skin of the panels. Surface mounted steel or plastic buttons will not be accepted.

- Insulation shall be rigid urethane "Foamed-In-Place". The thermal conductivity factor (K) shall not exceed 0.135 BTU per hour, per square foot, per degree Fahrenheit, per inch. Overall coefficient of heat transfer (U-factor) shall not be more than .033 for 4" walls. The R-Factor shall have a value of R30. Insulation shall have a 98% closed cell structure and average in-place density of 2.25 lbs. per cubic foot
- The insulation must retain dimensional stability in an operating temperature range of -40 degrees F. (-40.0C) to 250 degrees F.

5.0 WALK-IN DOORS

W.A. Brown & Son, Inc. 209 Long Meadow Dr. Salisbury, NC 28147

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- 5.1 Manufacturer's standard door shall be flush mounted. Both door and leaf shall be of similar construction and finish as wall panels.
- 5.2 A heavy duty 14 gauge steel "C" channel of "ADDISON POWER H BRACE" style construction shall be "Foamed-In-Place" around entire door opening to secure hardware and prevent racking and warping. This steel structure when used in conjunction with the FRP door jamb shall form a rigid frame that eliminates thermal transfer from the exterior to the interior of the panel thus reducing the requirement for additional anti-condensate heaters.
- The door leaf shall consist of a heavy 4* wide, .250* thick, thermally fused and polished PVC perimeter into which the interior and exterior metal skins are secured and shall create a thermal break between metal facings. In addition, the PVC frame shall include a "RIBBED" channel around the inside perimeter into which the magnetic gasket shall mate and be firmly held. Each door leaf must also include interior 14 gauge steel "C" channels across the entire face of the door at the hinge and latch stress points. Additional "C" channels are to be "Foamed-In-Place" behind the interior face to accept protector plates when required and to increase strength and rigidity. Interior steel plates for securing additional hardware (i.e., Foot treadles, door closers, etc.) shall be a standard part of door construction. Securing hardware into wood blocks will not be accepted.
- The door sections shall have a frame which is made of a pultruded FRP (Fiberglass Reinforced Plastic) material that provides both strength and durability. This FRP frame shall have a channel molded into it which will accept the anti-sweat heater and a easy replacement of the heater.
- 5.5 Each freezer door shall have a single anti-condensate heater and shall be concealed behind the stainless steel edge of the door jamb on all sides to prevent condensation and frost formation. This heater shall be easily accessible for replacement or service.

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General Specifications

No heater shall be required around the perimeter of the door leaf. Applications of 35 degrees F. and above shall not require a door heater.

- 5.6 When a threshold is required it shall be made of 12 gauge stainless steel and must be an integral part of the door section. The threshold must be installed by the factory and shall be of universal design which will allow the door section to be moved from one location to another without any preparation by installers.
- 5.7 A dial thermometer shall be mounted on the door panel. It shall provide temperature reading in a minimum range of -40 degrees F to + 99 degrees F and be accurate to + or 1 degree F.

6.0 DOOR HARDWARE

- 6.1 The door hinges shall be of cam-lift design and shall be heavy duty chrome plated with steel pins and nylon bushings. Hinges shall have a minimum 9" strap and shall be installed in sufficient numbers to carry twice the weight of the door.
- 6.2 The door latch shall be constructed of similar materials and finish as the door hinges. The latch shall be designed to open the door easily. The inside safety release features shall comply with OSHA standards.

7.0 GASKETS FOR WALK-INS

7.1 A vinyl gasket with a magnetic core using "Christmas Tree Type Construction" shall mate with the top edge and along both sides of the door. The magnetic force of the gasket shall be ample enough to keep the door in a closed position and form a tight seal. The bottom edge of the door shall contain a flexible double wiper gasket.

80 LIGHTING

- 8.1 Each entrance door shall be provided with an incandescent vapor-proof light on the interior of the door section. The light shall have a coated glass shatterproof globe. A neon pilot light and toggle switch shall be flush mounted on the exterior of the door section and shall have a stainless steel cover. The door panel and door leaf shall be UL approved in its entirety, including all mounted accessories.
- 8.2 A vapor proof light shall be capable of accepting up to a 100 watt appliance bulb (not furnished by manufacturer).

9.0 HOUSEKEEPING AND SAFETY PROCEDURE

9.1 Each door panel shall have a metal housekeeping and safety release procedure placard and shall be attached with pop-rivets to the metal skin of the door leaf. This placard will be in a highly visible location.

10.0 INSTALLATION AND MAINTENANCE INSTRUCTIONS

10.1 A complete set of instructions covering both the maintenance and the installation of the cooler shall be provided.

11.0 N.S.F. APPROVAL (NSF.)

11.1 Construction shall be of a design approved by the National Sanitation Foundation and shall carry the N.S.F. Label of Approval mounted on each door section.

12.0 UL ELECTRIC APPROVAL

12.1 All door sections shall be wired electrically in such a manner and design so as to be approved by Underwriters Laboratories and each door section shall carry the UL Listing Mark.

13.0 UL 25 FLAME SPREAD CLASSIFIED** (UL)

13.1 Each individual panel shall have a flame spread rating of 25 or less, and have a smoke development of 400 or less. Each section shall have affixed to it a label stating the above ratings. (Class I composite panel.)

**This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions. (See UL Classified Building Materials Index)

14.0 LIFETIME PANEL WARRANTY

- 14.1 W.A. Brown & Son, Inc. warrants to the original purchaser, the full foamed-in-place aluminum and stainless steel panels manufactured and sold by it, to be free from defects in material and workmanship under normal use and service for life from the date of original installation by an authorized representative. All other panels manufactured by W.A. Brown & Son, Inc. shall be warranted against delaminating and/or insulation separation for life from the date of original installation by an authorized representative. Oxidation of panels, and panel aesthetics are expressly excepted from this warranty.
- 14.2 This warranty shall not apply to equipment which in the manufacturer's opinion, has been subjected to abuse, misuse, misapplied, or improperly installed. See warranty detail packed with each walk-in unit shipped.

15.0 CEILING PANEL SUPPORT SYSTEMS

15.1 When the dimensions of an insulated room are such that a single span top panel is not applicable, it must be supported using an interior or exterior beam or must be supported by all thread rods (not furnished by manufacturer) attached to the building superstructure. Wood and steel structures which cause added maintenance shall not be acceptable.

16.0 REFRIGERATION

16.1 Pre-assembled hermetic or semi hermetic systems are available. This system includes the condensing unit, unit cooler, expansion valve (loose), dehydrator, sight glass, pre-wired control panel, liquid line solenoid (loose), high and low pressure control, room thermostat (loose) & suction line filter. It will also include the weatherproof housing, head pressure control and crankcase heater.
Since Product Improvement is a continuing effort at W.A. Brown & Son, Inc., we reserve the right to make changes in specifications

W.A. Brown & Son, Inc. 209 Long Meadow Dr. Salisbury, NC 28147 Page 2 Section 1 Rev. 5-00 Quality First in Freezers and Coolers Since 1910

Doors are Important specification points!

Δ 4'x5' walk-in

cooler has more

storage space than

a 3 door reach-in!



If your walk-in is to be located indoors, how many doors are there from the unloading point to the final location? What is the size of these doors? Is there room enough to maneuver the panels as the walk-in is delivered to the final site? For example, if you have to go up an elevator, will the elevator hold the length of the panels, or will you have to figure out another method (such as going through a window) to gain access to the final assembly site.

Walk-In doors are available in many sizes from 24" up to 60". Standard doors are 34" wide however, custom sized doors are avail-

Doors finishes are usually available in the same material as modular panels.

Since doors are the only moving part on your Walk-In, look at the door construction. Make sure your manufacturer is using heavy guage "C" channel construction in their doors and that all accessories are firmly fixed to these channels for longer life.

Door options include locking latches; automatic door closers; locking bars; observation windows; third hinges, extra dial thermometer, and digital alarms, just to name a few.



Figuring shelving for your Cooler or Freezer...

If you have determined that you have 80 cubic feet or less of permanent refrigeration needs, a walk-in may not be the most economical solution to your needs. A three-door reach-in may do the job. If you are in this category but the bulk of your needs involve dunnage or large cases of product, there are walk-ins as small as 4'x5' that will prove appropriate. And usually they offer more storage space than the three door reach-in cooler, at about the same price.

After you calculate the size of your Walk-In, determine the lineal feet of shelving by and the number of shelves per section in order to obtain the lineal feet of shelving sections. Most accounts use a 4 tier section. Once you determine the lineal feet of shelving, add 15%-25% for increased business, for the future, and for special food buys. Add 25% if all or most shelving is reserved for loose products. Keep in mind the depth of shelving you will be using. Normally shelving comes in 12", 18" and 24" depths. If you are in doubt, figure your shelving at 18" in width.



A sketch of your walk-in always helps!

When you complete all the above, you will have the total lineal feet of shelving needed. Multiply this figure times the depth of the shelves for total square footage or floor space required for shelving. Multiply this figure by two for required aisle space. Compare this with your estimated storage needs.



This figure should get you 90% of the way to determining sizing requirements. If this figure exceeds the amount of available floor space, consider going five shelves high (in lieu of four) to reduce floor space by approximately 20%. If you choose this route, be aware that you will be required to specify a taller box. Further requirements are possible by creating free standing shelving in the center of the box. This shelving will "share" workspace with the wall shelves. Be sure that this configuration allows for unimpeded access to the door.

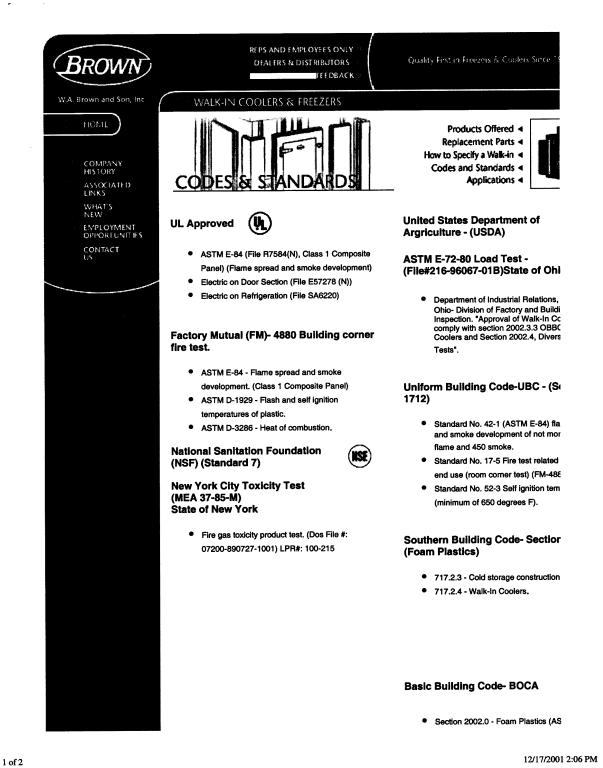
If the final figures exceed available space, you may have to consider adding a walk-in unit outside your kitchen space, or more frequent deliveries.

Be sure to include room to access the shelves in your isles.

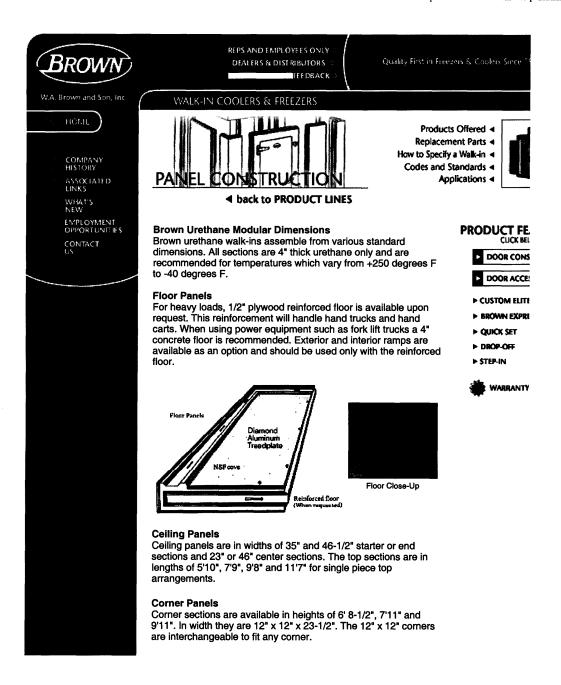
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Codes & Standards

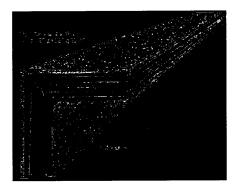


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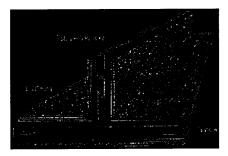
Wall Panels

The wall panels are available in the same heights as the corners and are in widths of 23" and 46" and with door sections of 46" or 69" widths. All sections are interchangeable. The same sizes are also used in the partitions of multi-compartment combinations.



T-Section

Allows you to have a common wall between freezer and cooler compartments.

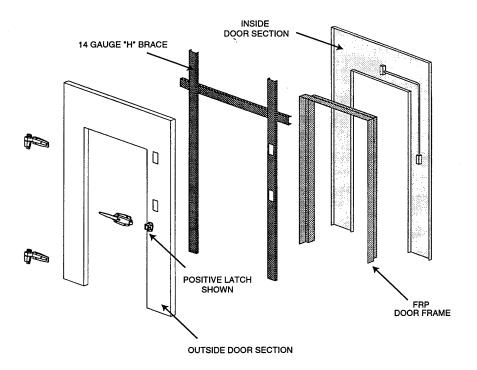


Outdoor Roofs
We recommend a single-ply membrane roof for all outdoor applications. Other roofing systems are available. Units are so structurally sound they can be placed outdoors as a stand alone building.

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Door Section Construction

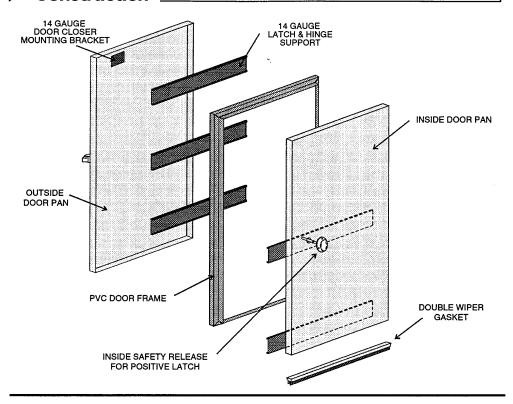


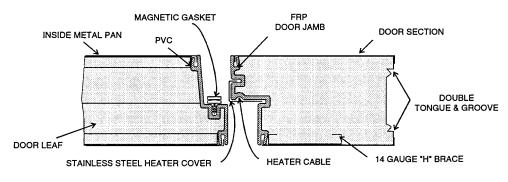


The Brown door is made with 14 gauge steel "C" channels "Foamed-In-Place". All accessories are fastened to the steel channels. All thresholds are 12 gauge stainless steel and are an integral part of the door section.

Door Leaf Construction







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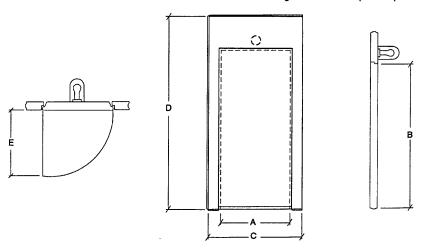
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Door Dimensions

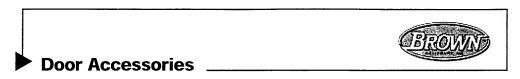
HEIGHT		WIT	'H FLC	ЮR		WITHOUT FLOOR					HEIGHT	WITH FLOOR						WITHOUT FLOOR				
7'5'/4"	Α	В	С	D	Е	А	В	С	D	E	10'8"	А	В	С	D	Е	А	В	С	D	Е	
	26	75	46*	801/2	32	26	761/2	46*	801/2	32		26	79	46*	119	32	26	801/2	46*	119	32	
	30	75	46*	801/2	36	30	761/2	46*	801/2	36		30	79	46*	119	36	30	801/2	46*	119	36	
	34	75	46*	801/2	40	34	761/2	46*	801/2	40		34	79	46*	119	40	34	801/2	46*	119	40	
	42	75	69	801/2	48	42	761/2	69	801/2	48		42	79	69	119	48	42	801/2	69	119	48	
	48	75	69	801/2	54	48	761/2	69	801/2	54		48	79	69	119	54	48	801/2	69	119	54	
	54	75	69	801/2	60	54	761/2	69	801/2	60		54	79	69	119	60	54	801/2	69	119	60	
	60	75	69	801/2	66	60	761/2	69	801/2	66		60	79	69	119	66	60	801/2	69	801/2	66	
8'8"	30	79	46*	95	40	34	801/2	46*	95	40	12'8"	30	79	46*	143	40	34	801/2	46*	143	40	
	34	79	46*	95	40	34	801/2	46*	95	40		34	79	46*	143	40	34	801/2	46*	143	40	
	42	79	69	95	48	42	801/2	69	95	48		42	79	69	143	48	42	801/2	69	143	48	
	48	79	69	95	54	48	801/2	69	95	54		48	79	69	143	54	48	801/2	69	143	54	
	54	79	69	95	60	54	801/2	69	95	60		54	79	69	143	60	54	801/2	69	143	60	
	60	79	69	95	66	60	801/2	69	95	66		60	79	69	143	66	60	801/2	69	143	66	

*Also available in 57 $^{1}/_{2}$ " and 69" sections. Additional heights available upon request.

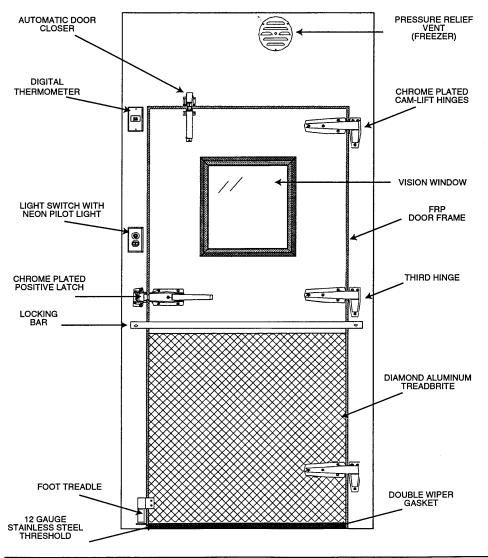


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WALK-IN DOOR WITH OPTIONAL ACCESSORIES



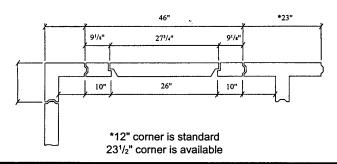
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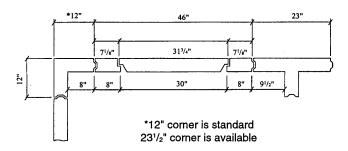


Door Locations _

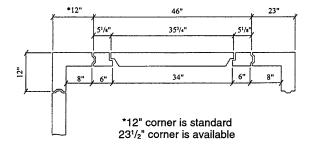
26" DOOR IN A 46" DOOR SECTION



30" DOOR IN A 46" DOOR SECTION



34" DOOR IN A 46" DOOR SECTION



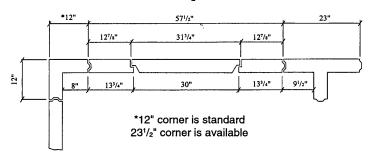
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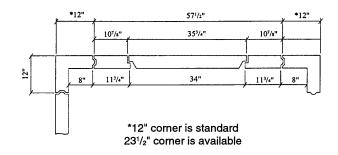


Door Locations _

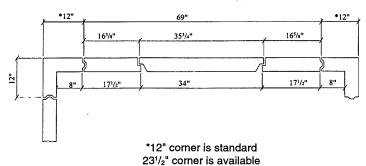
30" DOOR IN A 571/2" DOOR SECTION



34" DOOR IN A 571/2" DOOR SECTION



34" DOOR IN A 69" DOOR SECTION



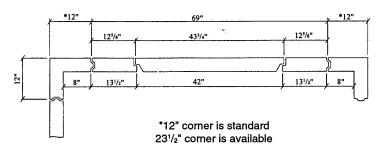
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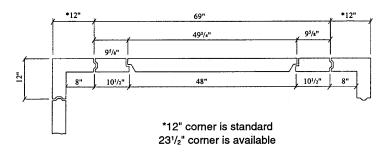


Door Locations _

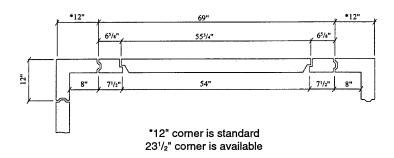
42" DOOR IN A 69" DOOR SECTION



48" DOOR IN A 69" DOOR SECTION



54" DOOR IN A 69" DOOR SECTION



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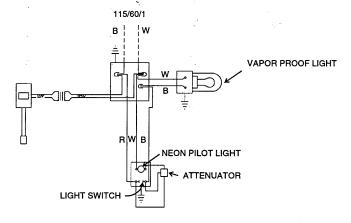
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Electrical Information

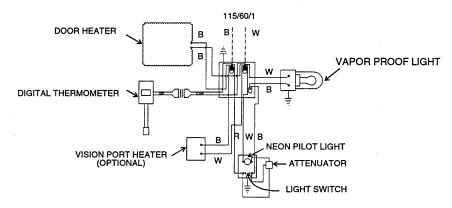
B = BLACK R = RED W = WHITE

TYPICAL WIRING DIAGRAM WALK-IN COOLER DOOR



Note: If fluorescent lights are wired to light switch the attenuator must be removed.

TYPICAL WIRING DIAGRAM WALK-IN FREEZER DOOR



Door heaters are standard on all freezers. If door heaters are desired on coolers they must be specified. Note: If fluorescent lights are wired to light switch the attenuator must be removed.

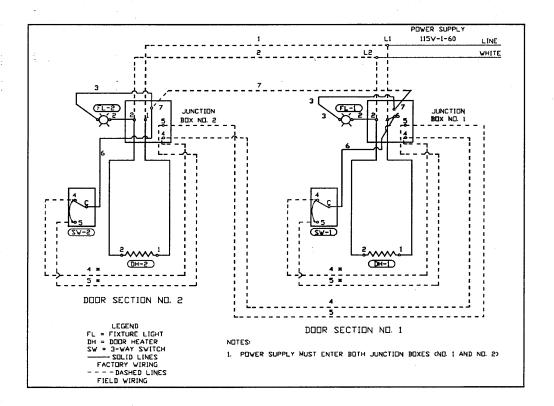
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Electrical Information

TYPICAL WIRING DIAGRAM 3 WAY LIGHT SWITCH FOR 2 DOOR WALK-IN

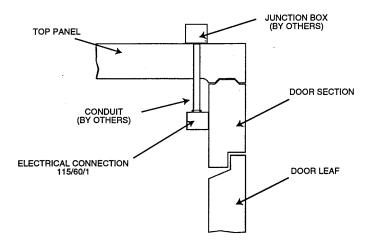


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Quality First in Freezers and Coolers Since 1910



Electrical Information



Conduit must be vapor sealed both inside and outside with an approved sealant.

STANDARD 78" DOOR HEIGHT

DOOR SIZE	LIGHT	DOOR HEATER	DIGITAL THERMOMETER	VISION PORT	PRP (Separate Hook Up)
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS
30" WIDE	100 WATT MAX.	1.06 AMPS	12 VOLTS	.6 AMPS	.2 AMPS

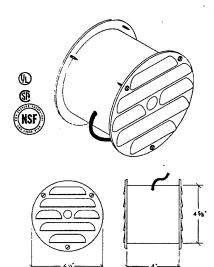
All door voltage is 115/60/1.

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Pressure Relief Port



	Α	B*	С
1830	5 3/32"	4"	3 1/2"
1832	6 1/4"	4"	4 5/8"
1834	5 3/32"	4"	3 1/2"
1836	6 1/4"	4	4 5/8"

*Other lengths available to specification

Heated valves prevent freeze-ups and reduce condensation on coolers. Two-way valve permits air flow in both directions, compensating for air expansion and contraction. Supplied in 115 or 220 volt models.

1830 Pressure Relief Port

Specifications

Material: all metal parts aluminum, self-extinguishing Lexan internal sleeve

Finish: Aluminum

Weight: Approx. 2 lbs.

Other Information: Drilled for No. 8 (4.2 mm) screws. Electrical requirement: 110v or 220 v, specify voltage required. Standard size 4" (101.6 mm)wall thickness, specify other wall thickness when ordering.

1834 Pressure Relief Port

Same as 1830 without heating element.

1836 Pressure Relief Port

Same as 1832 without heating element.

VENTILATOR QUANTITY SELECTOR

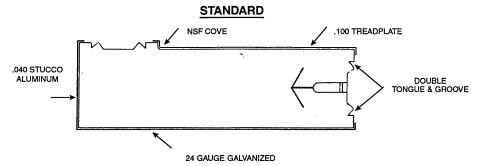
Size of Cooler Ft.	Volume of Cooler Ft.3	NO. OF VENTILATORS REQUIRED			UIRED
		0 to 10 Fa	ahrenheit	-30 to 0 F	ahrenheit
		-17.8 to -12	2.2 Celsius	-34 to -17	.8 Celsius
		1832 1830		1832	1830
5 x 5 x 7	175	1	1	1	1
10 x 10 x 7	700	1	1	1	1
15 x 15 x 7	1,575	1	1	1	1
25 x 25 x 7	2,800	1	1	1	2
20 x 20 x 7	4,375	1	2	2	3
30 x 30 x 7	6,300	1	2	2	3
35 x 35 x 7	8,575	1	2	2	3
40 x 40 x 7	11,200	2	3	2	4
45 x 45 x 7	14,175	2	3	2	4
50 x 50 x 7	17,500	2	4	3	5
55 x 55 x 7	21,175	2	4	3	6
60 x 60 x 7	25,200	3	5	4	7

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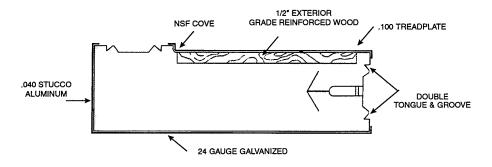






W.A. Brown standard floor panels are constructed with a .100 aluminum treadplate surface. These panels are made to support a uniformly distributed load of 750 lbs. per square foot.

REINFORCED



This reinforced floor will withstand a uniformly distributed load of 1000 lbs. per square foot.

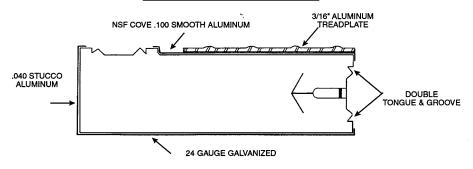
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Quality First in Freezers and Coolers Since 1910

Floor Details Standard



3/16" ALUMINUM TREADPLATE



This method of construction will withstand a uniformly distributed load of 2500 lbs. per square foot.

Note: The three methods mentioned above are for uniformly distributed loads. These methods are sufficient for normal light weight rolling carts and dollies. If heavy traffic is to be used (i.e. fork lifts, pallet jacks) then it will be necessary to have a concrete wearing surface installed above the insulated floor. Please review the following methods to determine the best application for your needs.

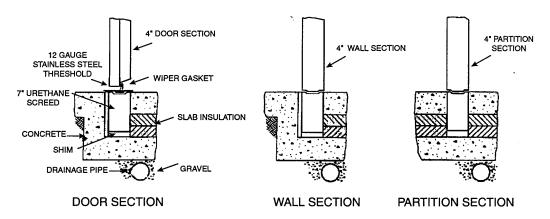
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Floor Details Screed

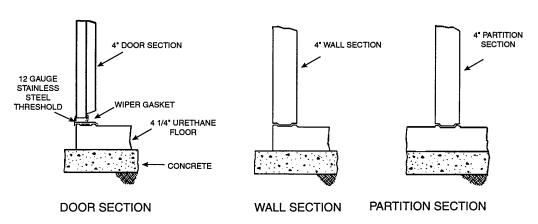


BUILT-IN FLOOR WITH 7" SCREED



The 7" screed and walls must be erected before the floor insulation and concrete wearing surface is poured.

PREFABRICATED FLOOR

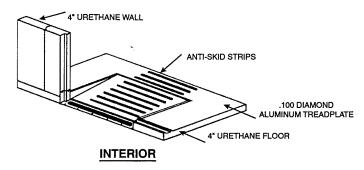


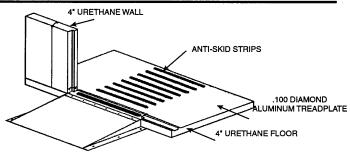
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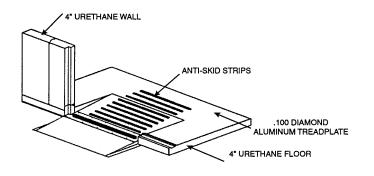
Floor Details Ramps







EXTERIOR



INTERIOR/EXTERIOR

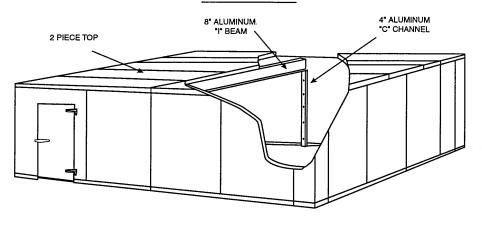
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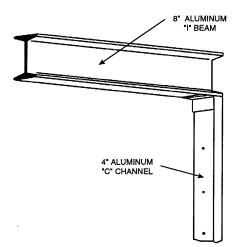
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Top Support Interior



INTERIOR BEAM





Interior 8" aluminum beams with 4" aluminum "C" channel can be used when the walk-in is erected indoors or outdoors. The maximum length for a clear span is 25'. For lengths longer than 25', a 4" round aluminum center post must be used. The aluminum post or "I" beam does not require painting and does not require maintenance as would be required when using steel or wood.

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Actual Sizes Chart _____



	OUTSIDE WALI	LENGTHS	
5'10'	36' 6"	° 67' 2 "	97' 10 "
6' 9¹/₂ "	37' 5¹/₂ "	68' 11/2"	98' 91/2"
7' 9"	38' 5"	69' 1"	99' 9"
8' 8¹/₂ "	39' 41/2"	70' 01/2"	100' 81/2"
9'8"	40' 4 "	71' 0"	101' 8"
10' 7¹/₂ "	41' 31/2"	71' 11'/ ₂ "	102' 71/2"
11' 7"	42' 3 "	72' 11"	103' 7"
12' 6¹/₂"	43' 2¹/₂ "	73' 10¹/₂ "	104' 61/2"
13' 6"	44' 2"	74' 10 "	105' 6"
14' 5¹/₂ "	45' 1¹/₂ "	75' 9¹/₂ "	106' 51/2"
15' 5 "	46' 1 "	76' 9 "	107' 5 "
16' 4¹/₂"	47' 0 ¹ / ₂ "	77' 81/2"	108' 41/2"
17' 4 "	48' 0"	78' 8"	109' 4"
18' 31/2"	48'11'/ ₂ "	79' 71/2"	110' 31/2"
19' 3"	49' 11"	80' 7"	111'3"
20' 21/2"	50' 101/2"	81' 61/2"	
21' 2"	51' 10"	82' 6"	
22' 1¹/₂ "	52' 9¹/₂ "	83' 51/2"	
23' 1*	53' 9"	84' 5"	
24' 0¹/₂"	54' 8¹/₂ "	85' 41/2"	
25' 0 "	55' 8"	86' 4"	
25′ 11¹/₂ "	56 7¹/₂ "	87' 2 ¹ / ₂ "	
26' 11 "	57' 7 "	88' 3"	
27' 10¹/₂ "	58' 6 ¹ / ₂ "	89' 21/2"	
28' 10 "	59' 6"	90' 2"	
29' 9 ¹ / ₂ "	60' 5 ¹ / ₂ "	91' 11/2"	
30' 9"	61' 5"	92' 1"	
31' 8¹/₂ "	62' 41/2"	93' 01/2"	
32' 8"	63' 4"	94' 0"	
33' 71/2"	64' 31/2"	94' 11'/2"	
34' 7"	65' 3"	95' 11"	
35' 61/2"	66 21/2"	96' 10¹/₂"	
	+ Any Additional Sizes	in 111/2" increments.	

HEIGHTS

SINGLE PANEL WITH FLOOR WITHOUT FLOOR		WITH	DOUB FLOOR	LE PANEL WITHOUT FLOOR
6'8" 7' 51/2" 8'8" 9'8" 10' 8" 12' 8" 15' 8"	6'5" 7' 2-1/2" 8'5" 9'5" 10'5" 12' 5" 15' 5"	15' 6" 17' 4" 18' 7" 20' 7" 22' 7"	15' 3" 17' 1-½" 18' 4" 20' 4" 22' 4"	4' 10"/ 9' 11" 6'8-'½"/ 9'11" 7' 11"/ 9' 11" 9' 11"/ 9' 11" 11' 11"/ 9' 11"

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Quality First in Freezers and Coolers Since 1910

Square/Cubic Footage



			COOL	ERS/FREEZERS W	ITH FLOOR
NOMINAL SIZE	ACTUAL SIZE W X L	INTERIOR FLOOR AREA SQUARE FOOTAGE	7'51/4" INTERIOR CUBIC FOOT VOLUME	8'8" INTERIOR CUBIC FOOT VOLUME	10'8" INTERIOR CUBIC FOOT VOLUME
6 X 6	5'-10" X 5'-10"	27	181	214	267
6 X 7	5'-10" X 6'-91/2"	32	214	253	316
6 X 8	5'-10" X 7'-9"	37	248	293	366
6 X 9	5'X-10" X 8'-81/2"	42	281	332	415
6 X 10	5'-10" X 9'-8"	47	315	372	465
6 X 11	5'-10" X 10'-71/2"	51	348	412	515
6 X 12	5'-10" X 11'-7"	56	382	451	564
7 X 7	6'-9 1/2" X 6'-9 1/2"	38	254	300	375
7 X 8	6'-9 1/2" X 7'-9"	43	294	347	434
7 X 9	6'-9 1/2" X 8'-8 1/2"	49	334	394	493
7 X 10	6'-91/2" X 9'-8"	55	373	441	551
7 X 11	6'-9 1/2" X 10-71/2"	61	413	488	610
7 X 12	6'-9 1/2" X 11'-7"	67	453	535	669
8 X 8	7'-9" X 7'-9"	50	340	401	502
8 X 9	7-9" X 8-8 1/2"	57	386	456	570
8 X 10	7'-9" X 9'-8"	64	432	510	638
8 X 11	7'-9" X 10'-7 1/2"	71	478	564	705
8 X 12	7'-9" X 11'-7"	77	524	619	773
8 X 13	7'-9" X 12'-6 1/2"	84	570	673	841
8 X 14	7'-9" X 13'-6"	91	615	727	909
8 X 15	7'-9" X 14'-5 1/2"	98	661	782	977
9 X 9	8'-8 1/2" X 8'-8 1/2"	65	438	517	647
9 X 10	8'-8 1/2" X 9'-8"	72	490	579	724
9 X 11	8'-8 1/2" X 10'-7 1/2"	80	542	641	801
9 X 12	8'-8 1/2 X 11'-7"	88	594	702	878
9 X 13	8'-8 1/2" X 12'-6 1/2"	96	647	764	955
9 X 14	8'-8 1/2 X 13'-6"	103	699	826	1032
9 X15	8'-8 1/2" X 14'-5 1/2"	111	751	887	1109
9 X 16	8'-8 1/2" X 15'-5"	119	803	949	1186
10 X 10	9'-8" X 9-8"	81	548	648	810
10 X 11	9-8" X 10'-7 1/2"	90	607	717	896
10 X 12	9-8" X 11 '-7"	98	665	786	983
10 X 1 3	9'-8" X 12'-6 1/2"	107	724	855	1069
10 X 14	9-8" X 13'-6"	116	782	924	1155
10 X 15	9'-8" X 14-5 1/2"	124	840	993	1241
10 X 16	9'-8" X 15'-5"	133	899	1062	1328
11 X 11	10-71/2" X 10-71/2"	99	671	793	992
11 X 12	10'-7 1/2" X 11'-7"	109	736	870	1087
11 X 13	10'-7 1/2" X 12'-6 1/2"	118	801	946	1183
11 X 14	10-71/2" X 13'-6"	128	865	1022	1278
11 X 15	10'-7 1/2" X 14-5 1/2"	137	930	1099	1373
11 X 16	10-71/2" X15-5"	147	995	1175	1469
11 X 17	10'-7 1/2" X 16'-4 1/2"	156	1059	1251	1564
11 X 18	10'-7 1/2" X 17'-4"	166	1124	1328	1660

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Quality First in Freezers and Coolers Since 1910

Square/Cubic Footage



		INTERIOR	COOL	ERS/FREEZERS W	ITH FLOOR
NOMINAL SIZE	SIZE WXL	INTERIOR FLOOR AREA SQUARE FOOTAGE	7'5'/4" INTERIOR CUBIC FOOT VOLUME	8'8" INTERIOR CUBIC FOOT VOLUME	10'8" INTERIOR CUBIC FOOT VOLUME
12 X 12	11'-7" X 11'-7"	119	807	953	1192
12 X 13	11'-7" X 12'-61/2"	130	878	1037	1296
12 X 14	11-7" X 13'-6"	140	949	1121	1401
12 X 15	11'-7" X 14'-51/2"	151	1019	1204	1506
12 X 16	11'-7" X 15'-5"	161	1090	1288	1610
12 X 17	11'-7" X 16'41/2"	171	1161	1372	1715
12 X 18	11'-7" X 17'-4"	182	1232	1456	1819
12 X 19	11'-7" X 18'-3 1/2"	192	1303	1539	1924
12 X 20	11'-7" X 19'-3"	203	1374	1623	2029
13 X 13	12-61/2" X 12-61/2"	141	955	1128	1410
13 X 14	12'-6 1/2" X 13'-6"	152	1032	1219	1524
13 X 15	12'-61/2" X 14'-51/2"	164	1109	1310	1638
13 X 16	12'-61/2" X 15'-5"	175	1186	1401	1752
13 X 17	12'-6 1/2" X 1&-4 1/2"	187	1263	1492	1865
13 X 18	12'-6 1/2" X 17'4"	198	1340	1583	1979
13 X 19	12'-6 1/2" X 18'-3 1/2"	209	1417	1674	2093
13 X 20	12'-6 1/2" X 19'-3"	221	1494	1765	2207
14 X 14	13'-6' X 13'-6"	165	1115	1318	1647
14 X 15	13'-6" X 14-51/2"	177	1198	1416	1770
14 X 16	13'-6" X 15'5"	189	1282	1514	1893
14 X 17	13'-6" X 16'-4 1/2"	202	1365	1613	2016
14 X 18	13'-6" X 17'-4"	214	1448	1711	2139
14 X 19	13-6" X 18'-3 1/2"	226	1531	1810	2262
14 X 20	13'-6" X 19'-3"	238	1615	1908	2385
14 X 21	13'-6 X 20'-2 1/2"	251	1698	2006	2508
15 X 15	14'-5112" X 14'-51/2"	190	1288	1522	1902
15 X 16	14'-5 1/2" X 15'-5"	203	1377	1627	2034
15 X 17	14-5 1/2" X 16'-4 1/2"	217	1467	1733	2166
15 X 18	14-5 1/2" X 17'-4"	230	1556	1839	2299
15 X 19	14-5 1/2" X 18-3 1/2"	243	1646	1945	2431
15 X 20	14-5 1/2" X 19'-3"	256	1735	2050	2563
15 X 21	14'-5 1/2" X 20'-2 1/2"	270	1825	2156	2695
15 X 22	14'-5 1/2" X 21'-2"	283	1914	2262	2827
16 X 16	15'-5" X 15-5"	218	1473	1741	2176
16 X 17	15'-5" X 16-4 1/2"	232	1569	1854	2317
16 X 18	15'-5" X 17'-4"	246	1664	1967	2458
16 X 19	15'-5" X 18-3 1/2"	260	1760	2080	2600
16 X 20	15'-5" X 19'-3"	274	1856	2193	2741
16 X 21	15-5" X 20'-2 1/2"	288	1952	2306	2882
16 X 22	15-5" X 21'-2"	302	2047	2419	3024
17 X 17	16'-4 1/2" X 16'-4 1/2"	247	1671	1974	2468
17 X 18	16'-4 1/2" X 17'-4"	262	1773	2094	2618
17 X 19	16'-4 1/2" X 18'-3 1/2"	277	1875	2215	2769
17 X 20	16-41/2" X 19'-3"	292	1976	2335	2919

W.A. Brown & Son, Inc. 209 Long Meadow Dr. Salisbury, NC 28147 Page 2 Section 4 Rev. 5-00

Quality First in Freezers and Coolers Since 1910

Hand Sinks Type 302 Models CHS-1716-C, CHS-1716



SPECIFICATIONS

GENERAL

☐ CHS-1716-C Type 302 (18-8) stainless steel hand sink. Basin has 1-3/4" (45mm) radius coved corners. Full length 7" (178mm) high back splash. Exposed surfaces have a brushed finish. Furnished with a wall hanger and integral stainless steel support brackets. Carries NSF International Certification.

FURNISHED COMPLETE WITH:

SUPPLY: LK-499 chrome plated gooseneck spout faucet with aerator.

DRAIN: LK-8.

TRAP: LK-500 satin chrome tubing "P" trap with cleanout, waste arm to wall, and wall flange.

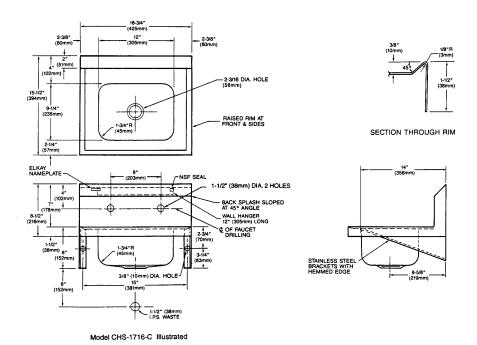
FOLLOWING MODEL DOES NOT INCLUDE FAUCET AND FITTINGS:

☐ CHS-1716

Specify faucet drillings and location.



CHS-1716-C Shown



Elkay Manufacturing Company

2222 Camden Court Oak Brook, IL 60523 Printed in U.S.A. ©1997 Elkay Mfg. Co. (Rev. 6/97) 4-1D

OUTSTANDING STANDARD **FEATURES**

 Energy Efficient - High production and Readily Convertible to:

Hot Water Sanitizing – 150°F Wash Temperature minimum, 180°F Final Rinse, 53 racks per

Chemical Sanitizing - Normal Duty - 120°F Minimum Wash and Final Rinse Temperature (140°F Recommended), Injection of Sodium Hypochlorite required, 62 racks per hour.

Chemical Sanitizing - Light Duty - 130°F Minimum Wash and 120°F Minimum Final Rinse Temperature (140°F Recommended), Injection of Sodium Hypochlorite required, 80 racks per hour.

- Low water consumption (1.2 gallons/rack).
- · Rinse system with exclusive Sani Dwell Cycle (Hot Water Sanitizing only).
- · Microcomputer controls.
- · LED Display of Cycles (Fill, Wash, Rinse) and Temperature.
- · Built-in service aids for enhanced serviceability.
- · Choice of Electric Heat, Gas Immersion Tube Heat, or
- · Steam Injectors.
- Microcomputer control of water temperature and positive protection against tank heat damage.
- · All stainless steel revolving upper and lower interchangeable wash arms.

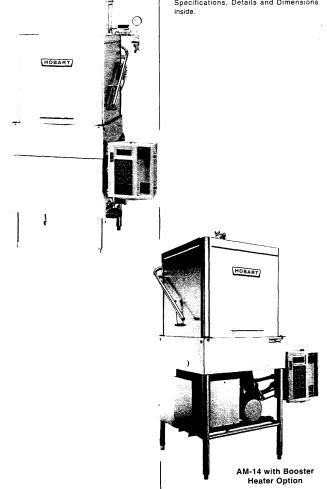
AM-14 AM-14C DISHWASHERS

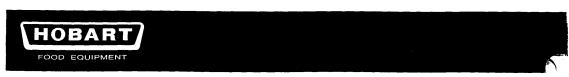
- · All stainless steel revolving upper and lower rinse arms.
- Microcomputer controlled motor protection.
- · Door actuated drain closer.
- Exclusive all stainless steel interior.
- · Self-flushing stainless steel strainer pans.
- · Large, removable scrap basket.

- · Snap-in stainless steel front panel (on AM-14).
- Field adjustable control box height 45/8" to 125/8" to table.
- Inspection Door (on AM-14).
- · Manual By-Pass Controls.

All of these standard features make this Hobart AM Dishwasher an outstanding value for exceptional dishwashing performance, with built-in Hobart reliability.

Specifications, Details and Dimensions





DETAILS, DIMENSIONS AND CONNECTIONS AM-14

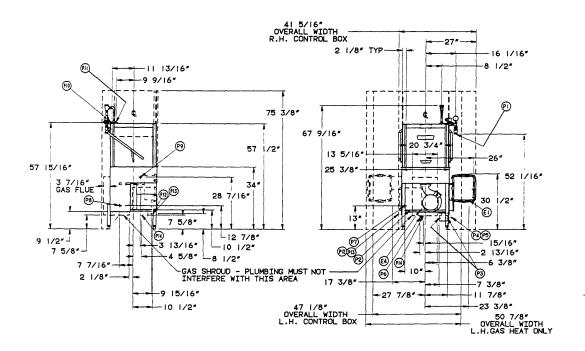
GAS HEATED DISHWASHERS WARNING FOR NATURAL GAS, PRESSURE TO THE BURNER (CUSTOMER CONNECTION) SHOULD NOT EXCEED 7" N.C. ELECTRICAL AND GROUNDING CONNECTIONS
MUST COMPLY WITH THE APPLICABLE
PORTIONS OF THE NATIONAL ELECTRICAL
CODE AMD/OR OTHER LOCAL ELECTRICAL CODES. CONNECTION SOURCE DETROITED FOR LIQUIFIED PETROLEUM GAS, PRESURE TO THE BURNER (COSTONER CONNECTION) SHOULD NOT EXCEED 11" V.C. A PRESSURE THAT OF THE MUST BE INSTALLED FOR OTHER PROPERTY. IN THE GAS LIVE TO THE DISHMASHER. PLUMBING CONNECTIONS MUST COMPLY WITH APPLICABLE SANITARY, SAFETY. AND PLUMBING CODES. GAS HEAT BTU INPUT - 20,000 NATURAL 20,000 PROPANE PLUMBING NOTES: WATER HANNER ARRESTOR (MEETING ASSE-1010 STANDARD OR EQUIVALENT) TO BE SUPPLIED (BY OTHERS) IN COMMON WATER SUPPLY LINE AT SERVICE COMMETION. RECOMMENDO WATER MARNESS TO BE 2-6 MAINS FOR BEST RESULTS.

RECOMMENDED BUILDING FLOWING WATER PRESSURE TO THE

DISMASSER IS 20-22 PG.II FPRESSURES WIGHT THOUGH THAN 2P BI

ARE PRESSY! A PRESSY REGULATING WALVE MAST BE SUPPLIED

(BY OTHERS) TO THE WATER LIKE TO THE DISMASSER. 14 1/4"-12 11/16" FOR CONVENIENCE WHEN CLEANING, WATER TAP SHOULD BE INSTALLED NEAR MACHINE WITH HEAVY DUTY HOSE AND SQUEEZE VALVE. 11" I" MIN CLEARANCE FROM FLUE (GAS) 8 3/16"-FLOWING STEAM PRESSURES ABOVE 50 PSI MUST HAVE A PRESSURE REQULATOR (NOT SUPPLIED) INSTALLED IN THE STEAM LINE. 2 5/16" 4 1/2" MIN CLEARANCE-FROM CHAMBER (STEAM OR ELECTRIC) SHUT OFF VALVE MUST BE SUPPLIED (BY OTHERS) IN THE STEAM LINE TO THE DISHMASHER. -14 9/16* Ð WĄĽL MISCELLANEOUS NOTES: ALL CIMENSIONS TAKEN FROM FLOOR LINE MAY INCREASE 3/4" OR DECREASE 1/2" DEPENDING ON LEG ADJUSTMENT. 15 3/167 18 15/16"— NET WEIGHT OF MACHINE: 360 LBS. (INCLIDING 4 RACKS) W/O BOOSTER DOMESTIC SHIPPING WEIGHT: 450 LBS. (INCLIDING 4 RACKS) W/O BOOSTER 14 5/16" NET WEIGHT OF MACHINE: 4D2 LBS. (INCLUDING 4 RACKS) W/ BOOSTER DOMESTIC SHIPPING WEIGHT: 492 LBS. (INCLUDING 4 RACKS) W/ BOOSTER 29 1/8" DOPES ILL STATE FOR MEASURE TO A 19-3/4" DRAIN LEVER LOSS (19-3/4" X 19-3/4" X 19-3/4" DRAIN LEVER LOCATED INSIDE TANK. VERY LOCATED INSTITUTE TOO CPH EDWLIST I H.P. NOTOR CONTROL BOX IS ADJUSTABLE TO 4-5/8 STANDARD OR 12-5/8. 1 12 5/8" € **⊚**€



AM-14 AM-14C **DISHWASHERS**

CONNECTION INFORMATION
(*AFF - ABOVE FINISHED FLOOR) LEGEND

- EI ELECTRICAL CONNECTION, MOTORS & CONTROLS (INCLUDING ELECTRIC HEAT WHEN SPECIFIED), 1-1/4" CONDUIT HOLE, 15-15/16" AFF.
- E2 ELECTRICAL CONNECTION, DETERGENT FEEDER, 3/4° CONDUIT HOLE, 17-3/4° AFF.
- ELECTRICAL CONNECTION: RINSE AGENT & SANITIZER FEEDERS. 3/4" CONDUIT HOLE, 22-1/8" AFF.
- ELECTRICAL CONNECTION, BOOSTER, 1/2", 3/4", OR 1" CONDUIT HOLE, 10-1/2" AFF. AVAILABLE ON STEAM OR ELECTRIC TANK HEAT MACHINES ONLY.
- 10-12" AF. ANALUSE DN STEM OF ELETRIC YAM HEAT MACHINES ON COMEN WATER CONNECTION, INVO BOOSTER!
 (1807 F WATER KIN. HOT WATER SANTITIZING)
 (1807 F WATER KIN. CHEMICAL SANTITIZING)
 (1807 F WATER KIN. CHEMICAL SANTITIZING-LIGHT DUTY)
 (1807 F WATER KIN. CHEMICAL SANTITIZING-LIGHT DUTY)
 (1807 F WATER KIN. HOT WATER SANTITIZING)
 (1807 F WATER SANTITIZING)
 (1807 F WATER

- 374" PFT, 6-374" AFF.

 STEAM COIL, (MEN) ROBSED): 10 TO 25 PST
 FLORING, 50 PST NAX., 374" PFT, 6-374" AFF.

 COMENSATE RETURN (STEAM COIL-MEN GOORDE); 10 TO 50 PST FLOWING,

 374" PFT, 7-1/4" AFF. (MUDGET TYPE TRAP FLORIS-ED).

 STED ASSEMBLY TO ACCESS 174" HOLE, 13" AFF DELVIC CAP AND

 STLD ASSEMBLY TO ACCESS 174" HOLE, 13" AFF DELVIC CAP AND

 STLD ASSEMBLY TO ACCESS 174" HOLE, 12" AFF DELVIC CAP AND

 STLD ASSEMBLY TO ACCESS 174" HOLE, 12"-74" AFF

 POST ACCESS 174" HOLE, 12"-74" AFF.

 STLD ASSEMBLY TO ACCESS 174" HOLE, 12" AFF.

 STLD ASSEMBLY TO ACCESS 174" HOLE, 12" AFF.

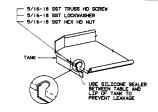
 STLD ASSEMBLY TO ACCESS 174" HOLE, 12" AFF.

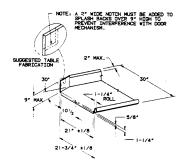
 ST
- PB

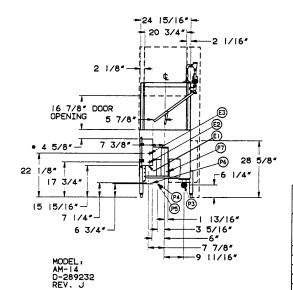
- 7/8" HOLE, 38-7/16" AFT.

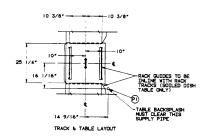
 PIO PINSE COURT FEEDER 1/8" MPT, PERONE 1/8" MPT,
 PIDE PLUE TO ACCESS TAPPED HOLE, 57-15/16" AFT,
 PII SANTITUSE FEEDER, (NORMAL/LIGHT DUTY) LISE MPT, REMOVE 1/8" MPT
 PIDE PLUE TO ACCESS TAPPED HOLE, 37-15/16" AFF,
 PIC ALS CONSCITUTE MIT. (MEDI ORGERED);
 1/2" FPT, 8-1/2" AFT.

- PIS GAS CONNECTION L.P. (WHEN GROERED),
 1/2" FPT, 8-1/2" AFF.
 PIS GAS CONNECTION L.P. (WHEN GROERED),
 1/2" FPT, 8-1/2" AFF.
 PIS GROENE-TOPPERATURE PELIED VALVE, WHEN SCOSTER IS SPECIFIED, 3/4" F.P.T.,
 HAST SE PIPED TO UPEN GRAIN RECEIVER IN THE FLOOR, 7-5/8" AFF.









BOOSTER	MPACIT	Y RATINGS	10 KW	BOOSTER ELECTRICAL SPECIFICATIONS
				200/60/1
1		MINIMUM	MAXIMUM	230/60/1
ELEC.	RATED	CIRCUIT	OVERCURRENT	200/60/3
SPECS.	AMPS	CONDUCTOR	PROTECTIVE	230/60/3
		AMPACITY	DEVICE	460/60/3
200/60/1	48	60	60	• 220/50/1
230/60/1	45.5	60	60	• 200/50/3 • 240/50/3
200/60/3	27.7	40	40	THESE ELECTRI
230/60/3	26.3	40	40	SPECIFICATION
460/60/3	13.1	20	20	ARE NOT SUBMI

AM-14 WITH STEAM OR GAS HEAT			
ELEC. SPECS.	RATED	MINIMUM SUPPLY CIRCUIT CONDUCTOR AMPACITY	MAXIMUM OVERCURRENT PROTECTIVE DEVICE
100-120/60/1	19.7	25	25
200-230/60/1	11.4	15	15
200-230/60/3	7.6	15	15
400-460/60/3	5.3	15	10

ELEC. SPECS.	RATED AMPS	MINIMUM SUPPLY CIRCUIT CONDUCTOR	MAXIMUM OVERCURREN PROTECTIVE
		AMPACITY	DEVICE
100-120/60/1	60.8	80	80
200-230/60/1	39.9	50	50
200-230/60/3	23.9	30	30
400-460/60/3	15	15	15

MACHINE ELECTRICAL SPECIFICATIONS SPECIFICATIONS
100-120/60/1
200-230/60/1
200-230/60/3
400-460/60/3
115/50/1
220/50/1
220/50/3
380/50/3 THESE ELECTRICAL SPECIFICATIONS ARE NOT SUBMITTED FOR UL LISTING





STANDARD DESIGN FEATURES



PUMP: High efficiency self-draining pump assures maximum cleanliness and sanitation.



CONTROL BOX: Mounted on right side of machine, below table level, to provide easy access to the microcomputer controls. Field adjustable in height from floor 4%" to 12%".



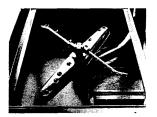
DOOR CYCLE SWITCH: Automatically starts the washrinse timer program when doors are closed. Door cycle switch turns off power to pump if doors are opened while machine is operating and resets timer program to start position.



AUTOMATIC TEMPERATURE CONTROL AND POSITIVE LOW-LEVEL WATER PROTECTION: The stainless steel probe contains a Thermistor Sensor for water temperature control and a Reed Switch works in conjunction with the float (below the probe) for positive low-level water protection.



UPPER WASH & RINSE ASSEMBLY: Wash arm – all stainless steel (Hobart exclusive design) provides improved washability. Interchangeable with lower wash arm. Revolving upper rinse arm assures efficient, effective rinse coverage.



LOWER WASH AND RINSE ARMS: Wash arm — all stainless steel, interchangeable with upper wash arm. Lower revolving rinse arm assures effective rinse coverage.



REMOVABLE SCRAP BASKET: Stainless steel, self-flushing strainer pan and removable scrap basket for easy cleaning.



AUTOMATIC DRAIN SHUT-OFF: Door actuated, automatically closes drain when doors are lowered.

AM-14 AM-14C DISHWASHERS

HOBART
FOOD EQUIPMENT

SPECIFICATIONS Listed by Underwriters Laboratories Inc. and by NSF International.

Meets Requirements of A.S.S.E. Standard No. 1004.

The microcomputer-based control system is built into the AM-14 Series Dishwashers. Model AM-14 is for straight-through operation with a third (front) door for inspection, and AM-14C for corner installation. Each is available in standard electrical specifications of 100-120/60/1, 200-230/60/1, 200-230/60/3, 400-460/60/3 and all are equipped with a reduced voltage pilot circuit transformer.

*CAUTION: CERTAIN MATERIALS, INCLUDING SILVER, ALUMINUM AND PEWTER ARE ATTACKED BY SODIUM HYPOCHLORITE (LIQUID BLEACH) IN THE CHEMICAL SANITIZING DISHWASHER MODE OF OPERATION. WATER HARDNESS MUST BE CONTROLLED TO 2-6 GR. FOR BEST RESULTS.

CONSTRUCTION: Tank and wash chamber constructed of #16 gauge stainless steel, arc-welded. Unitized welded stainless steel tank, frame and stainless steel feet. Wash chamber and front of tank above motor compartment are polished satin finish. New stainless steel snap-in front panel — no faster are required.

DOOR LIFT: Doors coupled by chromeplated door handle, spring counterbalanced (except the front inspection door). All doors guided for ease of operation and long life.

PUM 2: With Ni-Resist impeller, integral with mote assures alignment and quiet operation. Pum 3 shaft seal with stainless steel parts and a combon ceramic sealing interface. Easily and a combon ceramic sealing interface. Easily and a combon ceramic sealing interface. Easily more provided impeller housing permits ease of spection. Capacity 160 GPM. Pump is ampletely self-draining.

IOTOR: Hobart-built, 1 H.P., with solid state thermal protection, grease-packed ball bearings, splashproof design, ventilated. Single-phase is capacitor-start, induction-run type. Three-phase is squirrel-cage, induction type.

MICROCOMPUTER CONTROL SYSTEM: Hobart microcomputer controls, assembled within water-protected enclosure, provide built-in performance and reliability.

The microcomputer control, switches and contactors are housed in a single enclosure, mounted on right-hand side of dishwasher below table level. Control enclosure is field adjustable to an alternate lower position to clear standard 12" deep table trough of table sink installation. The line voltage electrical components are completely wired with 105°C, 600V thermoplastic insulated wire with stranded conductors and routed through listed electrical conduit. Low-voltage electrical components are wired with type ST cord. Line disconnect switch NOT furnished.

CYCLE OPERATION: The microcomputer timing program is started by closing the doors, which actuates the door cycle switch.

The microcomputer energizes the wash pump motor contactor during the wash portion of the program. After the wash, a dwell permits the upper wash manifold to drain. At the end of the dwell, the final rinse solenoid valve is energized; after the final rinse valve closes, Sani-Dwell (Hot Water Mode only) permits sanitization to continue. The Rinse LED remains on during this period, completing the program. If the microcomputer is interrupted during a cycle by the door-cycle switch, the microcomputer reset to the beginning of the program. Hot Water Sanitizing - 62 seconds (53 Racks/ hr.): 40 Second Wash, 4 Second Dwell, 9 Second Rinse, 9 Second Sani-Dwell. Chemical Sanitizing (Normal Duty) - 53 Seconds (62 Racks/hr.): 40 Second Wash, 4 Second Dwell, 9 Second Rinse, Chemical Sanitizing (Light Duty) - 40 Seconds (80 Racks/hr.): 27 Second Wash, 4 Second Dwell, 9 Second Rinse (130°F Minimum). All of the above programs and many more can be pre-selected by your Hobart service

WASH: Hobart revolving stainless steel wash arms with unrestricted openings above and below provide thorough distribution of water jets to all dishware surfaces. Arms are easily removable for cleaning and are interchangeable. Stainless steel tubing manifold connects upper and lower spray system.

RINSE: Eleven overhead rotating rinse spray nozzles with two nozzles mounted to spray and sanitize the interior of the chamber. The stainless steel upper and lower rinse arms are easily removable without tools and feature curved ends for greater uniformity of rinse coverage. Lower revolving rinse arm with nine nozzles lifts out for inspection. Diaphragm-type rinse control solenoid valve mounted outside machine. Machine is equipped with special hot water vacuum breaker on downstream side of rinse valve – mounted 6" above uppermost rinse opening. Easy open brass line strainer furnished.

FILL: Microcomputer controlled fill valve installed on upstream side of rinse vacuum breaker. Ratio fill method is used giving the correct fill at any flowing water pressure. (20 PSIG necessary for proper rinsing.)

DRAIN AND OVERFLOW: Large bell type automatic overflow and drain valve controlled from inside of machine. Drain automatically closed by lowering doors. Drain seal is large diameter, high temperature "O" ring. Cover for overflow is integral part of stainless steel strainer system.

STRAINER SYSTEM: Equipped with large, exclusive self-flushing, easily removable perforated stainless steel strainer and large capacity soil basket. Submerged soil basket minimizes frequent removal and cleaning.

HEATING EQUIPMENT: Standard tank heat is 5KW electric immersion heating element. Regulated power immersion tube gas burner system is optional at extra cost. A solid-state ignitor board controls the gas valve and provides flame ignition. A transformer steps the control circuit voltage down to 24 volts to power the ignitor board and gas valves. Gas Heated Dishwasher: For natural gas, gas pressure (customer connection) not to exceed 7" W.C. For liquefied petroleum, gas pressure to burner (customer connection) not to exceed 11" W.C. If gas pressure is higher than 7" W.C. natural or 11" W.C. LP, a pressure regulating valve must be supplied (by others) in the gas line to the dishwasher. Regulated 3/4" steam injector optional at extra cost. Water temperature regulation is controlled by thermistor sensor in combination with microcomputer controls. The tank heat and positive low water protection microcomputer circuits are automatically activated when the main power switch is turned "on". If tank is accidentally drained, low water protection device automatically turns heat off. Gas immersion tube is additionally protected by a high limit device mounted on the surface of the tube. These features are standard with the Hobart Microcomputer Control System.

STANDARD EQUIPMENT: In addition to the standard features listed on the front are the following—latest design door cycle switch, ratio fill, stainless steel adjustable feet. Adjustable height control panel. Chamber, tank and all doors of 16 gauge stainless steel. Detergent injector and sensing connections provided as well as connection in fill line for rinse agent and sanitizer dispensing. Manual by-pass switch.

OPTIONAL EQUIPMENT AT EXTRA COST – ELECTRIC BOOSTER HEATER: Electric booster adequately sized to raise 120°F inlet water to 180°F. Pressure/temperature relief valve and pressure gauge for incoming water.

Peg and Combination 19¾" x 19¾" Hobart heavy duty all-plastic racks.

ACCESSORIES: Desirable functional accessories can be furnished at added cost. See listed options and accessories on this specification sheet. Write to the factory for special requirements not listed above.

As continued product improvement is a policy of Hobart specifications are subject to change without notice.



EXECUTIVE OFFICES 701 RIDGE AVENUE TROY, OHIO 45374-0001

LITHO IN U.S.A. (H-02)

Printed On Recycled Paper

FORM F-8091 (REV. 896)

Qty. _____ Item No.



FD3-150 FD3-200 FD3-300 FOODWASTE DISPOSERS

MEDIUM SIZE FAST, ECONOMICAL

In a profitable foodservice operation, there's no space, time or budget allowance for inefficient food waste handling. Here are the medium sized disposers that can end food waste storage, removal and clean-up – fast, economically.

SPECIFICATIONS

Listed by Underwriters Laboratories Inc. and meets requirements of A.S.S.E. Standard No. 1009 (50 Hz. Electrical Specifications not U L Listed).

MOTORS: Continuous duty rating, equipped with manual reset thermal overload inherent protection. Permanently lubricated ball bearings for upper and lower shaft support.

HOUSINGS: Heavy aluminum grind and discharge housings. Four bolts fasten the motor unit to the grind chamber, permit easy removal.

LEGS: Tubular stainless steel with bullet feet to support housing. Adjustable to 3 inches in either direction.

MOUNTING: All Hobart Disposers fasten to 7" I.D. (throat opening) cones. A vinyl isolating ring eliminates metal-to-metal contact at the cone mounting, reduces vibration and noise transmission.

STATIONARY SHREDDER RING: Abrasion resistant, Ni-Hard, 2½" high, 4 machine ground primary action breaker bars, 42 secondary action grinding teeth.

FLYWHEEL: Offset breaker blade, mounted at center, speeds grinding, prevents objects from "riding" at center. Two hardened stainless steel cutter blocks (fastened to flywheel with nylon locking screws) are replaceable, can be indexed for new cutting edges. Corrosion resistant Ni-Resist flywheel is 7% diameter, slots undercut the shredder ring to assure that particles are cut to proper size before passing to the drain line.

MOTOR SHAFT SEAL: Face-type seal consists of sintered bronze mating ring and spring loaded carbon ring insert in chemical resistant neoprene bellows. Mating surfaces are protected from grit or fibers by being recessed into flywheel. Should any moisture pass this seal, a flinger and drain tube are provided to insure immediate removal. In addition, a lip-type oil seal (located beneath the bearings) is an "added protection"

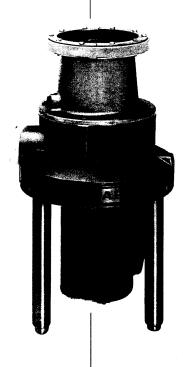
DRAIN CONNECTOR: The removable outlet flange is tapped for 2" pipe connection.

DUAL DIRECTIONAL GRINDING: Hobart Disposers operate in either direction of flywheel rotation. Direction of rotation can be controlled by the

of rotation can be controlled by the operator (to increase life and efficiency of grinding elements – back flywheel free of a "jam") when installed with Control Groups 2 or 3.

WEIGHT: Shipping – Approx. 95 lbs. (does not include accessory group or controls).

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.



FD3-150 FD3-200 FD3-300 FOODWASTE DISPOSERS

ACCESSORY GROUPS

GROUP A



Nitrile Rubber Scrapping Ring



Stainless Steel Silver-Saver Sleeve with Side Feed Hole



Water Swirl



Vacuum Breaker

GROUP B



Nitrile Rubber Silver-Saver Splash Guard Ring



Water Swirl



Vacuum Breaker

GROUP C



Nitrile Rubber Silver-Saver Splash Guard Ring



Vacuum Breaker



Pre-Rinse Spray with Wall Bracket

GROUP D



Nitrile Rubber Silver-Saver Splash Guard Ring



7" I.D. Stainless Steel Weld-in Adapter for Sink



Fixed Direction Water Inlet for Sink



Vacuum Breaker

ACCESSORY COMPONENTS

CONES-SINK – Stainless Steel Part No.





Sink 16" x 20" x 7" (7" opening) w/hole for water inlet 204015-2

WATER INLETS



Cone Water Swirl Inlet 1/2" N.P.T.204380



Fixed Direction Water Inlet (for sinks or troughs) ½" N.P.T.204346

FLOW CONTROL



8 Gallons per minute for Models FD3-150 through FD3-300 ¾" N.P.T.204368

CONE COVER -STAINLESS STEEL



15" Cone Cover w/feed hole 204024 18" Cone cover w/feed hole 204023

CONE FEEDING ACCESSORIES



Part No.

Nitrile Rubber Scrapping Ring ... 202113



SILVER-SAVER SPLASH GUARD RING



Nitrile Rubber Silver-Saver and Splash Guard Ring (for 7" opening cones, sinks and adapter)202120

SINK ADAPTER – Standard Group D Accessory



7" I.D. Stainless Steel Adapter for Welding to Sink or Trough 204853

VACUUM BREAKERS – Luster Chrome Plated



"74338

PRE-RINSE SPRAYS

PR-3 Heavy duty Flexible Pre-rinse Spray (38" high with wall bracket) ML-32333





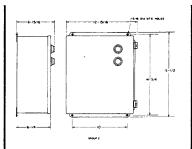
PR-4 Utility Spray (with wall bracket) ML-32334

Adapters are available to install Hobart Disposers on existing cones. See Form F-7543.

FD3-150 FD3-200 FD3-300 FOODWASTE DISPOSERS

ELECTRICAL CONTROL GROUPS Listed by Underwriters Laboratories Inc., for use with FD3 Disposers (50 Hz. Electrical Specifications not UL listed)

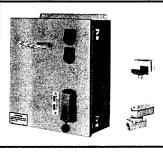


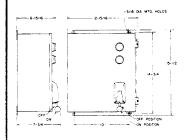


Group 2 - For all Models

Includes: Magnetic Contactors Pushbutton Start and Stop Automatic Reversing NEMA 12 Enclosure Solenoid Valve

> Approximate Shipping Wt. 31 lbs.



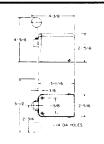


Group 3 - For all Models

Includes:
Magnetic Contactors
Pushbutton Start and Stop
Automatic Reversing
Low Water Pressure Cut-off
Time Delay for water after shut-off
Line disconnect
Solenoid Valve
NEMA 12 Enclosure

Approximate Shipping Wt. 38 lbs.





Group 4 - For Model FD3-150 and FD3-200

Includes: Manual Reversing Switch NEMA 1 Enclosure or NEMA 4 Enclosure Not available above 250 volts Optional Solenoid Valve

> Approximate Shipping Wt. 11 lbs.

Model	H.P.	Ph.	Hz.	Voits	Rated Amps
	11/2	1	60	120/208-240	17.2/8.2-8.6
FD3-150	11/2	3	60	208-240/480	4.8-4.8/2.4
FD3-200	2	1	60	120/208-240	20.0/10.0
1 03-200	2	3	60	208-240/480	6.8-6.5/3.3
FD3-300	3	3	60	208-240/480	9.0-8.0/4.0
ED0 450	1½	1	50	110-120/220-240	See customer service
FD3-150	11/2	3	50	220-240/380-415	5.7-6.1/2.7-2.7
FD3-200	2	1	50	110-120/220-240	See customer service
1 55-200	2	3	50	220-240/380-415	6.7-7.0/3.4-3.4
FD3-300	3	3	50	220-240/380-415	9.0-8.7/4.8-4.6

The slant (/) indicates the dual voltage operation accomplished by motor lead connection follow connecting diagram on motor.

SAMPLE SPECIFICATION

FD3-200 — B — 2 (240/60/3)

Electrical Specifications
Electrical Control Group

Accessory Group

Model Number

line of disposer discharge opening

Cut hole 19" for 18" cone. Hole to be 16" for 15" cone.

Solenoid must be installed in upright position.

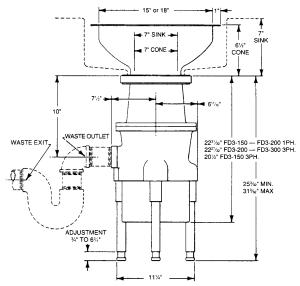
Disposer may be easily rotated for better drain line connection. Center line at wall outlet of trap should not be higher than center

If water pressure is in excess of 60 P.S.I. install a pressure reducing valve.

FD3-150 FD3-200 FD3-300 FOODWASTE DISPOSERS

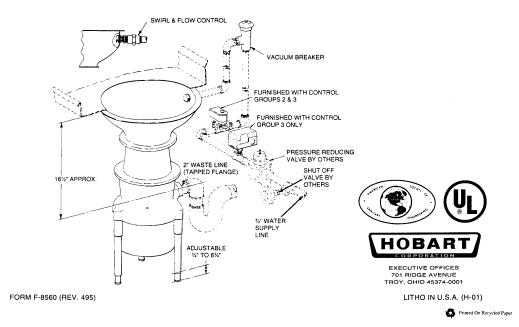


DETAILS AND DIMENSIONS



NOTE: Specify 15" or 18" Cone When Desired.

TYPICAL INSTALLATION



Item #	
Quantity	
	C.S.I. Section 1144

HOBART

TURBQ VASH

STANDARD FEATURES

- Type 304 polished stainless steel construction.
- 14 gauge stainless tanks and drain boards.
- 11" high x 2½" deep back splash.
- Sink front trim panel.
- Eight 1½" diameter wash nozzles.
- Removable, welded H frame leg sets and adjustable bullet feet.
- Detachable and adjustable height cross rails.
- Dual inlet strainers.
- Centrifugal pump with 4" diameter intake and 3" diameter outlet.
- 2 H.P. totally enclosed (TEFC) wash pump motor with permanently sealed bearings.
- Thermal overload and low water protection for wash pump.
- Automatic motor overload reset, manual restart required.

DIRECTION	I FROM S	OILED T	O CLEA	N END
-----------	----------	---------	--------	-------

- ☐ Right to Left
- ☐ Left to Right
- **VOLTAGE**
- □ 208-240/60/1
- 208-240/60/3
- 3 480/60/3

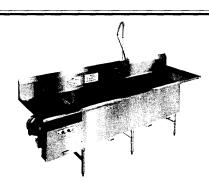
OPTIONS AT ADDITIONAL COST

- ☐ 2" IPS Sink Drains (shipped loose).
- ☐ 2" IPS Sink Drains w/Overflow (drains shipped loose).
- ☐ ¾" Mixing Faucets (shipped loose). Qty.___

- ☐ 1/2" Pre-Rinse Spray (shipped loose).
- Wash Sink Heater with high temperature and low water protection.
- Adjustable (by Hobart service) Pump Shutdown Timer.
- ☐ High Volume Wash Sink Sump (12" x 12" x 31/8" deep) with removable strainer.
- Wash Sink Separator at 36" (for wash sinks 42" or larger).
- ☐ Auto Fill.
- Utensil Basket.

15" Deep Over shelves with Wall Bracket		15"	Deep	Over	shelves	with	Wall	Bracket
---	--	-----	------	------	---------	------	------	---------

- 4' Over Shelf
- ☐ 6' Over Shelf
- 8' Over Shelf
- □ 10' Over Shelf□ 12' Over Shelf (split 6' and 6')
- ☐ 14' Over Shelf (split 8' and 6')
- ☐ 16' Over Shelf (split 8' and 8')
- ☐ 18' Over Shelf (split 10' and 8')
- ☐ 20' Over Shelf (split 10' and 10')
- ☐ Under Shelf for Clean End Drain Boards 30" and over



A SOILED END EDGE SELECTION O' wide/2' high Hemmed edge (not shown) 1-1/2' wide/2' high Rolled edge (shown) 2-1/2' wide/2' high Rolled edge (shown) Bolash (not shown) Dishmachine connection Minimum 36' Drain Board required	B SOILED END DRAIN BOARD OF 12 0 42' 0 20' 0 48' 0 30' 0 60'	C. WASH SINK 30' 48' 32' 54' 36' 60'	= A+B+C+D+E+F+ D RINSE SINK Omit 24": 15' 30": 18' 36": 20' Order 2 faucets if ordering these sizes	E SANITIZER SINK Domit 24" 18.5" 30"	F CLEAN END	G ——CLEAN END EDGE SELECTION O' wide/2' high Hemmed edge (not shown) 1-1/2' wide/2' high Rolled edge (sfrown) 2-1/2' wide/11' high End splash (not shown)
					=====================================	□ Dishmachine connection Minimum 20* Drain Board required

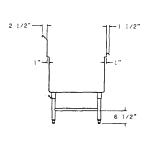
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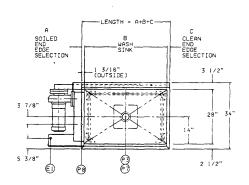
HOBART

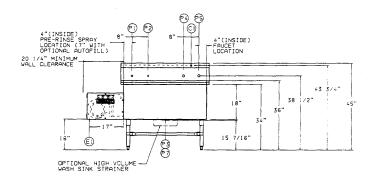
Qty.











CONNECTION INFORMATION (*AFF - ABOVE FINISHED FLOOR)

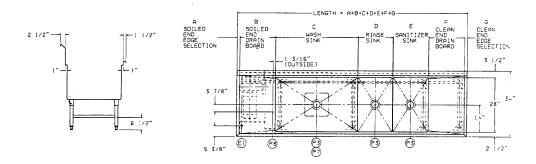
- ©1 DETERGENT CONNECTION:
 WASK SINK
 44" AFF.
- (E) ELECTRICAL CONNECTION: MOTORS & CONTROLS (INCLUDING ELECTRIC HEAT WHEN SPECIFIED) 16" AFF.
- PI HOT WATER CONNECTION: PRE-RINSE SPRAY: 1" DIAMETER HOLE 38-1/2" AFF.
- P2 COLD WATER CONNECTION: PRE-RINSE SPRAY: I" DIAMETER HOLE 38-1/2" AFF.
- P3 SINK DRPIN: 3-1/2" ID DRAIN DEPRESSION 15-7/16" AFF.
- P4 HOT WATER CONNECTION: MIXING PAUCET:)-1/4" DIAMETER HOLE 38-1/2" AFF.
- (PS) COLD WATER CONNECTION: MIXING FAUCET::-1/4" DIAMETER HOLE 38-1/2" AFF.
- (P7) OPTIONAL SINK STRAINER DRAIN: 3-1/2" ID DRAIN DEPRESSION 12-5/8" AFF.
- (P8) OPTIONAL AUTOFILL HOT WATER CONNECTION: 3/4" F.P.T. 26 9/16" AFF.

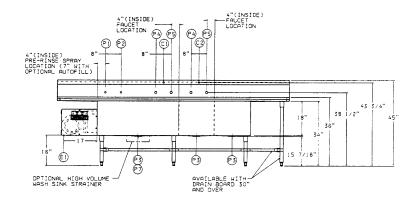
ELECTRICAL AND GROUNDS CONNECTIONS
MUST COMPLY WITH THE APPLICABLE
PORTIONS OF THE NATIONAL ELECTRICAL
CODE AND/OR OTHER LOCAL ELECTRICAL CODES.
PLUMBING CONNECTIONS.SINK AND BRAIN BOARD SIZES
MUST COMPLY WITH APPLICABLE SANITARY. SAFETY.
AND PLUMBING CODES.

NOTE: RECOMMENDED 10" AFF WALL DRAIN LOCATION
MISCELLANGEOUS NOTES:
ALL DIMENSIONS TAKEN FROM FLOOR LINE
MAY INCREASE 3/4" ON ECREASE 1/2"
DEPENDING ON LEG ADJUSTMENT.
NET WEIGHT OF MACH.NE: 18D*
DOMESTIC SHIPPING WEIGHT: TBD*

(w/0		DWASH TRIC HEAT:	,
ELEC. SPECS.	RATED AMPS	MINIMUM SUPPLY CIRCUIT CONDUCTOR AMPACITY	MAXIMUM OVERCURRENT PROTECTIVE DEVICE
208-240/60/1	9.2	15	15
208-240/60/3	6.4	15	15
480/60/3	3. 2	15	15

TURBOWASH WITH ELECTRIC HEAT						
ELEC. RATED SUPPLY OFFICERENT SPECS. RATED SUPPLY OFFICERENT CIRCUIT PROTECTIVE AMPACTITY DEVICE						
208-240/60/1	20.2	30	30			
208-240/60/3	17.4	20	20			
480/60/3	8. 7	15	15			





CONNECTION INFORMATION (*AFF - ABOVE FINISHED FLOOR)

- ©1 DETERGENT CONNECTION:
 WASK SINK
 44" AFF.
- © SANITIZER CONNECTION: SANITIZER SINK 44" AFF.
- E) ELECTRICAL CONNECTION: MOTORS & CONTROLS (INCLUDING ELECTRIC HEAT WHEN SPECIFIED) 16" AFE
- (P1) HOT WATER CONNECTION:
 PRE-RINSE SPRAY:1" DIAMETER HOLE
 38-1/2" AFF.
- (P2) COLD WATER CONNECTION:
 PRE-RINSE SPRAY: 1" DIAMETER HOLE
 38-1/2" AFF.
- P3 SINK DRAIN: (3 CONNECTIONS) 3-1/2" ID DRAIN DEPRESSION 15-7/16" AFF.
- (P4) HOT WATER CONNECTION: MIXING FAUCET:1-1/4" DIAMETER HOLE 38-1/2" AFF.
- (F) COLD WATER CONNECTION:
 MIXING FAUCET: 1-1/4" DIAMETER HOLE
 38-1/2" AFF.
- (P7) OPTIONAL SINK STRAINER DRAIN: 3-1/2" ID DRAIN DEPRESSION 12-5/8" AFF.
- (P8) OPTIONAL AUTOFILL HOT WATER CONNECTION:

WARNING
ELECTRICAL AND GROUNDING CONNECTIONS
MUST COMPLY WITH THE APPLICABLE
PORTIONS OF THE NATIONAL ELECTRICAL
CODE AND/OR OTHER LOCAL ELECTRICAL CODES.
PLUMBING CONNECTIONS.SINK AND DRAIN BOARD SIZES
MUST COMPLY WITH APPLICABLE SANITARY, SAFETY,
AND PLUMBING CODES.

NOTE: RECOMMENDED 10" AFF WALL DRAIN LOCATION (7" AFF FOR OPTIONAL WASH SINK STRAINER) MISCELLANGOUS NOTES: ALL DIMENSIONS TAKEN FROM FLOOR LINE MAY INVERSE 3/4" OR DECRESE 1/2" DEPENDING ON LEG ADJUSTMENT. NET WEIGHT OF MACHINE: DOMESTIC SHIPPING WEIGHT: TBD*

TURBOWASH (W/O ELECTRIC HEAT)					
ELEC. SPECS.	RATED GMPS	MINIMUM SUPPLY CIRCUIT CONDUCTOR AMPACITY	MAXIMUM OVERCURRENT PROTESTIVE DEVICE		
208-240/60/1	9.2	15	15		
208-240/60/3	6.4	15	15		
480/60/3	3.2	15	15		
TURBOWASH WITH ELECTRIC HEAT					

TURBOWASH WITH ELECTRIC HEAT							
ELEC. SPECS.	RATED AMPS	MINIMUM SUPPLY CIRCUIT CONDUCTOR AMPACITY	MAXIMUM OVERCURRENT PROTECTIVE DEVICE				
208-240/60/1	2C. 2	30	30				
208-240/60/3	17.4	20	20				
480/60/3	8.7	15	15				





HOBART TURBOWASH™ TAKES ON THE TOUGHEST PAN, RACK AND UTENSIL CLEANING JOBS.

- · Eliminates laborious scraping and scrubbing
- · Reduces labor costs
- · Improves employee morale
- · No more pans, racks and utensils that just don't come clean

TURBO ACTION DOES IT

Continuous high-power jets of turbulent water loosen even the worst baked-on food soil from pans and utensils while they soak in hot, soapy water. Your people will love it! And so will you. Because with TurboWash, the worst part of cleanup suddenly becomes the easiest.

THE RIGHT SIZE FOR YOUR OPERATION

Models are provided in left-to-right or right-to-left configurations. Options include multiple tanks, tabling, splash ends, scrap sinks, drain boards and disposers. Plus, we'll custom-build if necessary. Just right for:

- 18" x 26" bakery pans
- · Pizza pans
- · Rotisserie racks
- · Meat lugs
- · Mixer bowls
- · Other utensils







SPECIFICATIONS

Listed by Underwriters Laboratories Inc. Classified by Underwriters Laboratories in accordance with NSF Standard No. 2. Certified to CSA Standard.

Construction:

Type 304 polished stainless steel. 14 gauge tanks, drain boards, splashes and rolled rims. 11" high by 21/2" deep back splash. Wash sink with dual pump inlet strainers and eight angled stainless steel wash nozzles: 11/2" diameter. Heavy-duty centrifugal pump, 4" diameter intake, 3" diameter outlet (300+ GPM). 2 H.P. wash pump motor, totally enclosed, fan cooled (TEFC), permanently sealed bearings. Sink front trim panel. Removable, welded H-frame leg sets with detachable and adjustable cross

CONTROLS

Stainless steel control box. 208 volt through 240 volt, 60 cycle, single phase or three phase system. 480 volt, 60 cycle, three phase system. ON/OFF wash pump motor switch. Thermal overload and low water protection for wash pump. Automatic motor overload reset activated by restarting unit.

OPTIONS

- ☐ Available left-to-right or right-to-left configuration.
- ☐ Lever type drains with 2" IPS male thread and lever support brackets.
- ☐ High quality mixing faucets with ¾" hot and cold water connections.
- High quality pre-rinse spray with 1/2" hot and cold connections.
- ☐ Sink overflows plumbed to drains.
- water protection. Heat selector switch with off, normal (115°F) and high (140°F) settings.
- ☐ Switch operated, adjustable (from 1 to 8 hours by Hobart Service) pump shut-down timer. Factory preset to 4 hours.
- ☐ 12" x 12" x 31/6" deep, high volume wash sink sump with removable basket strainer.
- ☐ Removable, flow-through wash sink separator placed at 36" (for wash sinks 42" or larger).
- ☐ Solenoid operated auto fill system with ¾" hot water connection.
- Perforated utensil basket with wire form support and
- ☐ Under shelf for clean end drain boards 30" or longer.
- ☐ 15" deep wall mounted over shelves with brackets.

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

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F-39615 (Rev. 697)

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Qty._____ Item No. _____

HOBART

FD3-50 FD3-75 FD3-125 FOODWASTE DISPOSERS

FOOD EQUIPMENT

COMPACT SIZE -BIG VERSATILITY

Hobart Disposers are well recognized for quality and capacity. They're designed with your needs in mind - built with a large capacity for food wastes.

The following pages illustrate the variations of controls and accessories available to make these food waste disposers the most versatile equipment for small to medium sized clean-up systems.

SPECIFICATIONS

Listed by Underwriters Laboratories Inc. and meets requirements of A.S.S.E. Standard No. 1009 (50 Hz. Electrical Specifications not U L Listed.)

MOTORS: Continuous duty rating, equipped with manual reset thermal overload inherent protector. Permanently lubricated ball bearings for upper and lower shelf support. Upper bearing is sealed on both sides.

HOUSINGS: Heavy aluminum grind and discharge housings. Four bolts fasten the motor unit to the grind chamber, permit easy removal.

MOUNTING: All Hobart Disposers (except when using accessory group E), fasten to 7" I.D. (throat opening) cones. A vinyl isolating ring eliminates metal-to-metal contact at the cone mounting, reduces vibration and noise transmission.

STATIONARY SHREDDER RING: 13/4" high, 4 machine ground primary action breaker bars, 42 secondary action grinding teeth.

FLYWHEEL: Breaker blade, mounted at center, speeds grinding, prevents objects from "riding" at center. Two hardened stainless steel cutter blocks (fastened to flywheel with nylock screws) are replaceable, can be indexed for new cutting edges. Ni-Resist flywheel is 6%6" diameter, slots undercut the shredder ring to assure that particles are cut to proper size before passing to the drain line.

MOTOR SHAFT SEAL: Face-type seal consists of sintered bronze mating ring and spring loaded carbon ring insert in chemical resistant neoprene bellows. Mating surfaces are protected from grit or fibers by being recessed into flywheel. Should any moisture pass this seal, a flinger and drain tube are provided to insure immediate removal. In addition, a liptype oil seal (located beneath the bearings) is an "added protection" water seal.

DRAIN CONNECTOR: A chrome plated brass tailpiece is provided for connection to a 1½" standard drain trap.

DUAL DIRECTIONAL GRINDING:All Disposers operate in either direction of flywheel rotation. Direction of rotation can be controlled by the

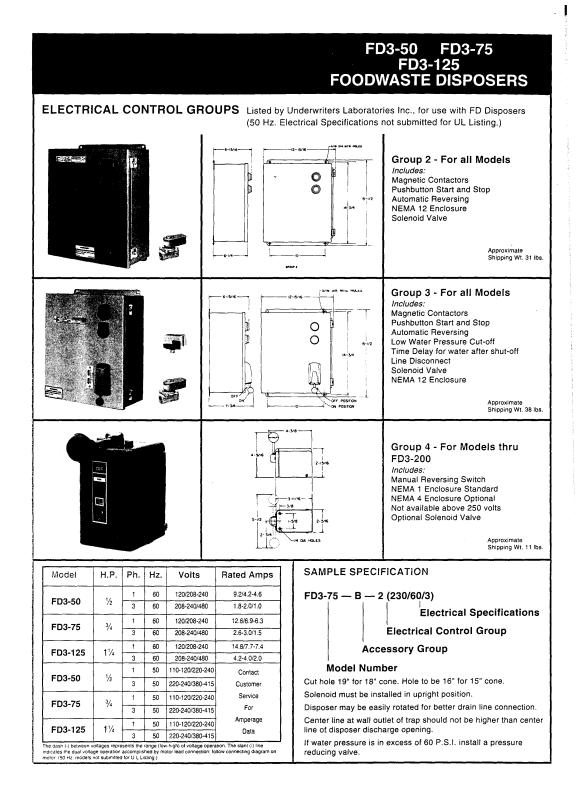
of rotation can be controlled by the operator (to increase life and efficiency of grinding elements — back flywheel free of a "jam") when installed with Control Groups 2, 3 or 4.

WEIGHT: Shipping – Approx. 60 lbs. (does not include accessory group or controls).

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.



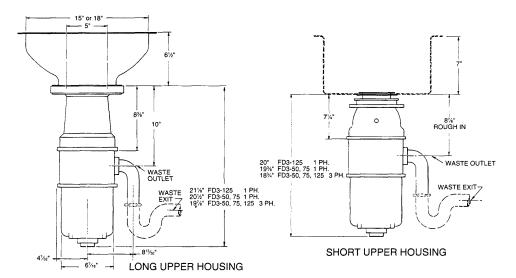
FD3-50 FD3-75 FD3-125 FOODWASTE DISPOSERS GROUP E (For use with short upper **CONE FEEDING ACCESSORIES ACCESSORY GROUPS** housing only.) Part No. NOTE: For use with GROUP A (For use with long upper short Upper Housing Foodwaste Disposer housing only.) Vinyl Scrapping Ring.. 202113 only. Vinyl Scrapping Cover Stopper and Ring Sink Adapter Assembly for 3½" to 4" Sink Opening Stainless Steel Silver-Saver Sleeve Stainless Steel with side feed hole 203870 Silver-Saver Sleeve with Side Feed SILVER-SAVER SPLASH **GUARD RING** Fixed Direction Vacuum Breaker Water Inlet for Sink Water Swirl Vacuum Breaker **ACCESSORY COMPONENTS** Vinyl Silver-Saver and Splash Guard Ring (for 7" opening cones, sinks GROUP B (For use with long upper 202120 and adapter) CONES-SINK - Stainless Steel housing only.) **VACUUM BREAKERS -**Chrome Plated Vinyl Silver-Saver Splash Guard Ring 277112 Cone 15" I.D. w/hole for water swirl204007 . PRE-RINSE SPRAYS Cone 18" I.D. w/hole for water swirl Water Swirl Vacuum Breaker Cone 18" I.D. w/out swirl hole 204003 GROUP C (For use with long upper PR-3 Heavy-duty Flexible Pre-Rinse Spray (38" high housing only.) Vinyl Silver-Saver Splash Guard Ring bracket) ML-32333 Sink 16" x 20" x 7" (7" opening) w/hole for water inlet 204015-2 WATER INLETS Cone Water Swirl Inlet 1/2" N.P.T. Vacuum Breaker204380 Fixed Direction Water Inlet (for sinks or 204346 troughs) 1/2" N.P.T. FLOW CONTROL PR-4 Utility Spray (with wall bracket) ML-32334 5 Gallons per minute for Models FD3-50 through FD3-125 3/4" N.P.T.201721 CONE COVER -STAINLESS STEEL Pre-Rinse Spray Adapters are available to install Hobart Disposers on existing competitive cones. See Form F-7543. with Wall Bracket 15" Cone Cover w/feed hole 204024 18" Cone Cover w/feed hole 204023



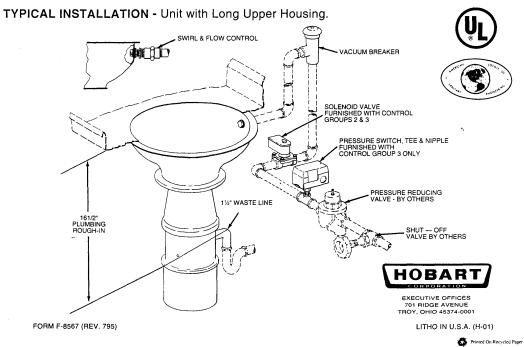
FD3-50 FD3-75 FD3-125 FOODWASTE DISPOSERS



DETAILS AND DIMENSIONS



NOTE: Specify 15" or 18" Cone When Desired.



Compact Refrigerators



GMR06AAW(white)

NSN:4110-01-484-5626

- * GE Spacemaker Compact Refrigerator
- * 6.0 cu ft
- * Manual Defrost
- * 3 Full-Width Fresh Food Door Shelves
- * 2 Adjustable Wire Cabinet Shelves
- * 2 Mini Ice'N Easy Trays
- * Color-Matched Visor Door Handles
- * Optional black panel available with TK6 trim kit
- * 34 1/4"H x 23 5/8"W x 25 7/8"D

Update:05/30/01



S-19 (white)

NSN:4110-01-472-4643

- * Summit
- * 1.7 cu ft value priced
- * smooth back
- * 4 ft cord
- * Reversible door
- * 21"H x 18"W x 19"D



S-23R (white)

NSN:4110-01-464-7160

SW-23R (walnut) NSN:4110-01-464-7244

- * Summit
- * 1.7 cu ft
- * 8 ft. cord
- * Reversible door
- * 20" H x 18 3/4" W x 20"D

*



FF-28 (white)

NSN:4110-01-472-4618

- * Summit
- * 2.3 cu ft, all refrigerator
- * Automatic defrost
- * Textured door
- * Reversible door
- * 25" H x 19"W x 18"D

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Qty. _____ Item No. _____

HOBART

HCR43, HCR431 & HCR49 RANGES

FOOD EQUIPMENT

- HCR43 RANGE WITH STANDARD OVEN: SIX ROUND FRENCH HOTPLATES
- HCR431 RANGE WITH CONVECTION OVEN: SIX ROUND FRENCH HOTPLATES
- HCR49 MODULAR RANGE

FOR HIGH PRODUCTION STOCK POT COOKING

Conventional Oven – Allows for all-purpose baking and roasting applications. Increases operation flexibility.

Convection Oven – Allows for allpurpose baking and roasting applications. Increases operation flexibility. Increases output; reduced temperature requirements for menu diversification.

Modular Design – (No oven base) Allows top configuration flexibility when no base is required.

Stainless Steel Front – Standard features. Durable and easy to clean

Spring Counter-balanced Oven Door – Prevents door from inadvertently dropping open. Forms a loading platform in open position; eases loading of product in oven.

Cool-to-touch Door Handle – Improves employee safety.

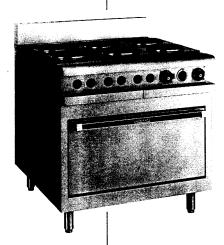
Oven Base Thermostatically Controlled - Variable, Bi-directional heat control (Low-Med-High). Allows food to be cooked at optimal temperature with maximum control.

High Density Insulation $-2\frac{1}{2}$ " in sides, top, back and bottom; 2" in door reduced heat loss. Holds heat longer; faster recovery.

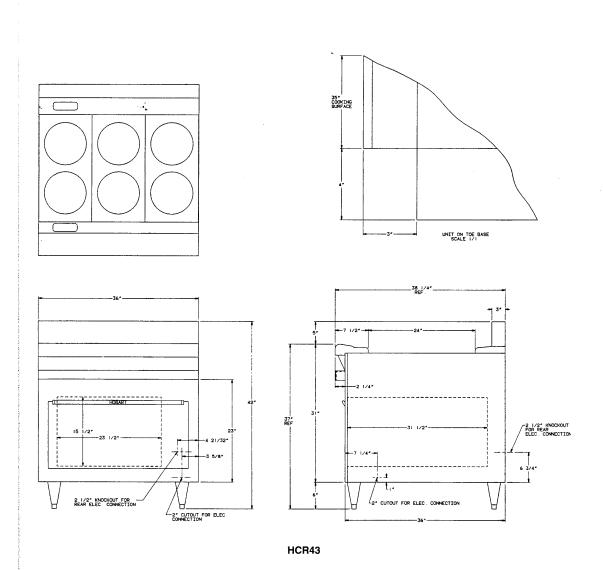
Two Porcelain on Steel Drawers – (Located under cooktop). One is baffled grease drawer; the other is warming drawer.

Porcelain on Steel Oven Cavity and Door Liner – Improves cleanability.

Specifications, Details and Dimensions on Reverse Side.



HCR43, HCR431 & HCR49 RANGES



HCR43, HCR431 & HCR49 RANGES



SPECIFICATIONS Listed by Underwriters Laboratories Inc and National Sanitation Foundation

GENERAL: Electric standard heavy-duty range with six 9½" round French hotplates. Model HCR43 is freestanding with one-pan, all-purpose standard oven. Model HCR431 is freestanding with integral compact convection oven. Model HCR49 is modular version.

CONSTRUCTION: Outer shell is reinforced sheet steel. Two drawers extend full width. Front and rear grease troughs have large drain openings. Round French hotplates are cast on. 5" high combination vent backsplash at rear. Models HCR43/431 have stainless steel fronts; sides are painted gray. Mounts on 6" stainless steel legs. Drop door forms a loading platform. Oven bottom is steel deck flanged at back and sides. Oven lining is porcelain on steel. Insulated at top, rear, both sides, bottom and door. Model HCR49 has stainless steel front; sides are painted gray.

CONTROLS: Each of the six hotplates are independently dial controlled. Each 480V hotplate is controlled by indicating 3-heat switch with ON-OFF position. Hotplate and oven controls are located below range's waterfall. Standard Oven: Top and bottom oven heating units are individually controlled by operating, reversible-heat switches on oven's control panel. Adjustable thermostat graduations are from OFF to 155-550°F. Convection Oven: Main power switch to energize heating elements and blower motor. Temperature dial has provided graduations from 200-550°F. Provided with an electric interlock which shuts off blower and heating elements when door is opened.

CAPACITY: Range surfaces can handle 90 to 120 portions of braised or sauteed items in a 10 minute cooking cycle or 450 servings of moist cooking items in one 2-3 hour cooking cycle. Each hotplate accommodates one 9-inch skillet or one 20-quart stock pot. Conventional Oven cavity 23½"W x 13"H x 31½"D accepts a single furnished rack on built-in two-position rack guides located in the cavity. Oven holds 60 pounds of meat in 4 sq. ft. deck area. Convection Oven cavity 19½"W x 14½"H x 27"D accepts three racks furnished on a built-in five-position rack guide with positive stops.

ELECTRICAL: HCR43 – 18.7 KW; HCR431 – 19.0 KW; HCR49 – 12.0 KW. Heating Units for oven are located at top of oven compartment and beneath oven deck. Wiring and connections are located behind and below control panel, are accessible from range front. Connections are tension-free and corrosion-resistant. 208-240V switch circuits protected by double-poke cutouts with manually resettable magnetic circuit breakers. (See "Electrical Data" block for phase loadings.)

OPTIONS

- ☐ Stainless Steel Side(s)
- ☐ Stainless Steel Back
- ☐ 4" Toe Base in place of legs 35" working height
- ☐ Less Legs for Curb Base
- 480-60-3 (Overload protection not included)
- 220/380V 3 Ph. 4-Wire or 2 Ph. 3 Wire
- 240/415V 3 Ph. 4-Wire or 2 Ph. 3
- ☐ Round High Speed Plates in place of any French Plate, specify location (not available 480V)

ACCESSORIES:

- ☐ Double deck back shelves
- ☐ 5" Diameter Casters (Front two locking)
- ☐ Extra Oven racks
 - Spreader Plates:
 - □6" □12"
 - □ 18"
 - ☐ Non-standard width

WEIGHT: (Approximate)

	Shipping	Net
HCR43	550	525
HCR431	575	550
HCD40		

As continued product improvement is a policy of Hobart, specifications are subject to change without notice

	TOTAL	TOTAL 3-PHASE LOAD					NOMINAL AMPS/LINE WIRE									
UNIT	TOTAL K.W.	W. KW PER PHASE			3 PHASE									1 PHASE		
OIVII	CONN.					208 V 240 V				480 V			040	400		
		X-Y	Y-Z	X-Z	Х	Υ	Z	X	Υ	Z	Х	Υ	Z	208	240	480
HCR43	18.7	6.7	4	8	61	45	50	53	39	43	19	27	22	90	78	39
HCR43/HCB48	24.7	9.7	7	8	74	70	63	64	60	54	27	30	33	119	103	N/A
HCR431	19	5.2	5.2	8.6	58	43	58	50	37	50	25	19	25	91	79	N/A
HCR431/HCB48	25	8.2	8.2	8.6	70	68	70	61	59	61	30	29	30	120	104	N/A
HCR49	12	4	4	4	33	33	33	29	29	29	14	14	14	58	50	25
HCR49/HCB48	18	7	7	4	46	58	46	40	51	40	14	25	25	87	75	38



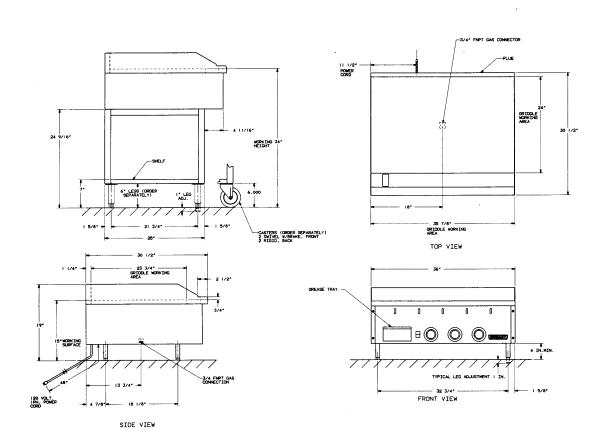
701 RIDGE AVENUE TROY, OHIO 45374-0001

FORM F-7897 (REV. 595)

LITHO IN U.S.A. (H-45)

GGO SERIES GAS GRIDDLES HOBART FOOD EQUIPMENT **ENERGY-EFFICIENT** • Automatic gas shut-off valve - Automatically turns off gas **HOBART GAS** if pilot is extinguished; in-**GRIDDLES DELIVER** creases safety. **BIG-VOLUME** • Burners equipped with front adjustable air shutters — PRODUCTION IN Simplifies optimal adjustment SHORT ORDER. of air/gas mixture; Increases burner efficiency - reduces Choice of Style - Standard or fuel costs. Deluxe — Deluxe features all stainless steel finish and solid state thermostats; Standard has electromechanical controls Deluxe version features all stainless steel griddle body Durable finish, easy cleaning. Extends equipment life; imand stainless steel front with proves sanitation. painted sides. ATCH #8 • 12" thermostatically con- Solid state thermostats trolled zones - Allows food to (Deluxe version) - Provides be cooked at optimal temperhigh reliability and temperature ature; allows various products to be cooked simultaneously at control plus/minus 5 degrees F. Improves food quality and different temperatures. consistency. 4" backsplash welded to Specifications, Details and Dimensions Inside griddle surface - Prevents grease splash out and eliminates leakage into griddle body. • Full width front grease trough — Allows scraping at any point on griddle surface; eases cleaning and accessi-bility. Reduces labor; improves sanitation. GGO36S (Standard) Full depth grease drawer — Anti-splash baffling removable from the front. Increases grease storage capacity; easily removed. Reduces cleaning labor; improves sanitation. • Griddle plate is 34" thick polished steel --- Fast response and accurate O temperature control; easily GGO48D (Deluxe) cleaned. Reduces energy; reduces cleaning labor; improves sanitation. • Large rectangular grease chute — Accommodates scraping with spatula; allows large food items to be scraped. Improves operator convenience and efficiency. ð ð • U-shaped burner design -GGO72D (Deluxe) Provides uniform griddle top heat distribution with no hot or cold spots; fast response to any load condition; Increases production capabilities.

GGO SERIES GAS GRIDDLES



GGO SERIES GAS GRIDDLES



SPECIFICATIONS Listed by National Sanitation Foundation. Certified by American Gas Association.

CONSTRUCTION: Cabinet has polished stainless steel front, painted gray sides, and mild steel back and side splashers. Splashers are 4" high and have a tapered edge toward the front of the griddle. Back panel on built-in rear flue is aluminized steel. Griddle plate is 34 " thick machine ground and highly polished steel, double welded to side and back splashers. Bot-tom of the grid plate is fully welded com-pletely around for strength. All-width grease trough 33/8" wide is polished stainless steel, will accommodate a 3" wide spatula. Chute leads into full-depth grease drawer made of aluminized steel with an anti-splash baffle and a rear inside carrying handle. 3 and 4-foot models have one grease drawer with a 134 gallon capacity; 6-foot model features two grease drawers with a total capacity of 3½ gallons. Built-in rear flue, front ventilation slots and adjustable burner air shutter are standard.

GAS: Aluminized steel burners consist of horizontal U-shaped tubing with a series of slot-like top ports which provide a uniform grid heat distribution pattern. Designed for either natural or liquefied propane gas. 30,000 BTU's per burner per hour. 3-foot griddle 90,000 BTU's; 4-foot griddle 120,000 BTU's; 6-foot grid-

dle 180,000 BTU's. Primary air controlled by adjustable air shutters on each burner. Burner designed for quiet ignition and operation. Gas supply inlet is ¾ " NPT diameter; located at right rear. A 5 " water column pressure regulator as standard is furnished for natural gas operation. For LP gas, the pressure regulator is 10 " water column. The standard design of this equipment is for natural gas having the following characteristics: 1000 BTU per cubic foot, .64 specific gravity. PLEASE SPECIFY: Type of gas and altitude of location of equipment when installed.

GAS CONTROLS: Gas pressure regulator and manual shut-off valve supplied for natural or propane gas. (Type of gas to be supplied must be specified.) In case of a pilot outage, pilots feature a shut-off to the gas supply. Gas connection is ¾ "FNPT at rear center. ON/OFF toggle switches are recessed.

POWER CORD: 120 Volt power cord is 4 feet long and is furnished with a three-prong grounding plug.

TEMPERATURE CONTROLS: One thermostat for each burner provides separate control for each 12" wide griddling section. Thermostats located at bottom of

front panel and are recessed to prevent damage. Temperature range is 150°-450°F and is controllable within 25°F of dial setting.

DELUXE MODELS:

Same as above, except the entire cabinet front, sides, back and side splashers are stainless steel. Controls: Solid state thermostats provide a controllable range of 150°-450°F plus or minus 5°F. Amber cycling light at foot of each griddle, cycles when preset temperature is reached. Electronic Pllot Ignition: A toggle switch turns on the electronic ignition system at startup. The system is turned off when the griddle is turned off and no gas is consumed when griddle is shut down. Gas shuts off automatically should electricity oo off.

ACCESSORIES: Four 4" polished stainless steel legs with adjustable feet. Stand with stainless steel legs and stainless steel shelf. (Working height of griddle on stand 34".)

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.



FORM F-8184 (REV. 292)

LITHO IN U.S.A. (H-45)

Qty. _____ Item No. _____

HOBART

HGC-40 SERIES GAS CONVECTION OVENS

HGC-401 - Single

section on 25¾" legs.

HGC-402 - Two sections on legs and stack sets.

HGC-403 - One section on cabinet base with 6" legs.

HGC-404 - Single section on Open Stand.

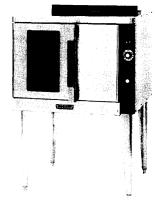
INCREASED ENERGY EFFICIENCY -IMPROVED HEATING SYSTEM USES LATEST TECHNOLOGY TO INCREASE ENERGY EFFICIENCY AT LEAST 33% VERSUS COMPETITIVE MODELS.

- Solid state thermostats Fast response to load conditions; improved temperature distribution for better baking uniformity. Increased production capacity.
- Exclusive combustion system
 — A power burner design provides maximum energy efficiency.
- Electronic ignition No standing pilot light to blow out.
- 60/40 Doors open simultaneously — Easy access to oven interior easy to clean. Doors provide air tight seal where doors meet thereby reducing energy costs.
- Recessed controls Prevents controls from being accidentally bumped out of adjustment.
- Cool down switch Allows blower to operate with heat source off while door is open. Allows rapid oven cool down for cleaning or cooking at lower temperatures.
- Heat cycle light Informs operator when oven reaches preset temperature.
- Cool-to-the-touch door handle

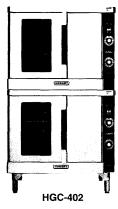
 Prevents operator from burning hands; eliminates need to wear gloves to open/close doors.

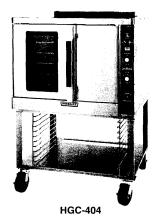
- Stainless steel door seal —
 Provides air tight seal where door
 meets oven; durable, long-life
 construction; easy cleaning.
- Stainless steel door liner and porcelain enamel oven cavity — Provides durable construction; easy cleaning. Optional stainless steel oven cavity.
- Door interlock switch Prevents blower and heater from operating when door is opened; reduces heat loss during load/ unload processes.
- Door observation window Allows product to be viewed for doneness without opening the doors.
- Two standard interior oven lights — Assist in viewing products; aids in cleaning process.
- Permanently lubricated fan motor — Eliminates routine motor maintenance. Reduces repair costs and downtime.
- Fan cover easily removable from oven interior — Provides easy access to blower fan inside of oven.
- High density insulation Located in oven walls and doors; reduces heat loss and holds heat longer
- Standard gas pressure regulator — Eliminates need for field installation; factory preset at optimal pressure.

Specifications, Details and Dimensions



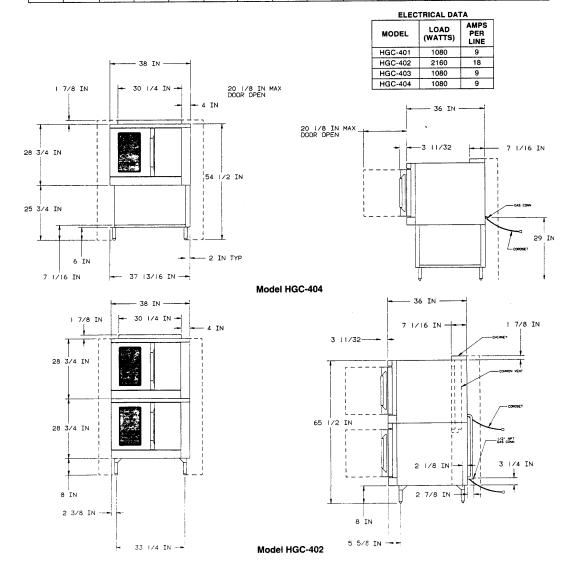
HGC-401





HGC-40 SERIES GAS CONVECTION OVENS

	GENERAL & DIMENSIONAL DATA						RACK DATA (PAN CAPACITIES SHOWN FOR SINGLE RACK)									
	OVERALL EXTERNAL DIMENSIONS				COMPARTMENT'S INTERNAL DIMENSIONS		NO. STD.	STD. RACK SPACING	NO. OPTIONAL	11 RACK SPACING	RACK SIZE	9" OD	#200	18"x26"		
MODEL	W	D	Н	W	D	Н	RACKS	RACKS				SPACING	312.5	PIE TINS	PANS	PANS
	IN.	IN.	IN.	IN.	IN.	IN.	HAUNS	HACKS IN.	RACKS	IN.	IN.	FILTING				
HGC-401	38	36	541/2	291/4	20	20	5	21/8	6	11/4	27½x20	6	2	1		
HGC-402	38	36	651/2	291/4	20	20	10	21/6	12	11/4	27½x20	6	2	1		
HGC-403	38	36	54½	291/4	20	20	5	21/8	6	11/4	27½x20	6	2	1		
HGC-404	38	36	541/2	291/4	20	20	5	21/8	6	11/4	27½x20	6	2	1		



HGC-40 SERIES GAS CONVECTION OVENS



SPECIFICATIONS Listed by National Sanitation Foundation. Certified by American Gas Association.

GENERAL: Gas convection oven. Basic section HGC40 is without legs; may be ordered separately for replacement, for stacking 2-high or for mounting either on legs or storage stand. HGC401 single basic oven section on 253/4" legs.

HGC402 two basic oven sections on 8" legs and stack set.

HGC403 single basic oven section on cabinet base with 6" legs.

HGC404 single basic oven section on storage stand and 6" legs.

CONSTRUCTION: Outer shell is reinforced sheet steel furnished in stainless steel front with permalucent gray sides, top and back. Optional all stainless steel finish is available. Insulation is applied to the top, rear, both sides, bottom and door(s).

Vertical 60/40 split doors are full height with a large double pane window. Doors swing wide to allow unrestricted access to the oven cavity. Single door handle stays cool to the touch.

Stainless steel seal is provided where door and oven cavity meet. Five chrome-plated racks with positive stops are furnished. Standard oven interior is porcelain enamel with stainless steel door

CONTROLS: Recessed controls are located on oven's right front. Line cord furnished for all models. Temperature dial graduations are from "OFF" to 150°—500°F. Equipped with easily adjustable calibration ring to eliminate costly recalibration of thermostat. A power switch energizes the gas burner and the blower. A separate switch controls the two cavity lights. Each oven cavity has three signal lights "Power On", "Heat",

and "No Ignition". Solid state thermostat control provides accurate temperature control of ±7°F. Electric buzzer timer controls accurate bake times up to 60 minutes. Automatic interlock switch shuts off blower motor and burner when the doors are opened. Cool down switch allows blower motor to operate with doors open and without energizing the heating system.

CAPACITY: Oven provided with 5 271/2" x 20" Racks and 11 Position Rack Guides.

ELECTRICAL: A two-speed 1/3 H.P. permanently lubricated oven blower motor is standard.

1/64 H.P. permanently lubricated combustion blower motor. Wiring and connections are located behind the control panel and are accessible from the front. Each section has two interior lights. Connections are tension free and corrosion resistant. Units are wired for 120 volts.

GAS: 40,000 BTU/hr. input. Designed for either natural or propane gas. Manual ON/OFF valve located at bottom of control panel for easy access.

Spark ignition provides reliable gas ignition. The combustion blower assures more complete mixture of gas and air for better energy utilization. The oven blower then recirculates heated air through the cooking compartment. The recirculated air is exhausted through the flue. Gas an is exhausted through the flue. Gas supply line must be equivalent of 3/4" NPT. A pressure regulator set for 3.5" water column is standard for natural gas; pressure regulator for LP gas is set for 10" water column. Standard design of the column is for natural gas better the column. this oven is for natural gas having the following characteristics: 1000 BTU per cubic foot, .64 specific gravity.

IMPORTANT

WHEN ORDERING: The following must be specified:
1) The type of gas.

- 2) The altitude of the location where the equipment will be installed.

The standard design of this equipment is for natural gas having the following characteristics:

1000 BTU per cubic foot .64 specific gravity

ACCESSORIES:

- Set of four 6" stainless steel adjustable
- Set of four 8" stainless steel adjustable legs.
- Set of four 253/4" adjustable stainless
- steel tubular legs.
 Set of four 253/4" adjustable painted
- designer legs. Set of four 25%" adjustable stainless
- steel designer legs.
- Set of four 6" high casters. Set of four 8" high casters. Set of four 8" stainless steel adjustable

- legs and stack kit. Set of four 8" high casters and stack kit.
- Single rack.
- Set of six racks.
- Stainless steel back.
- Open stand with storage rack.
- Centrigade thermostat indicator plates.

WEIGHT, (Approximate)

ale) Shinnina	Net
491 lbs.	471 lbs.
	912 lbs.
638 lbs.	618 lbs.
	568 lbs.
	952 lbs.

As continued product improvement is a policy of Hobart, specifications are subject to change wout notice.





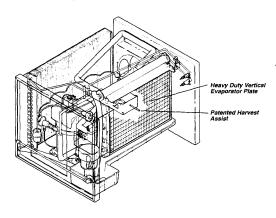


EXECUTIVE OFFICES 701 RIDGE AVENUE TROY, OHIO 45374-0001

LITHO IN U.S.A. (H-43)

FORM F-8174 (1194)

Unique, patented harvest assist system delivers ice to the bin faster (with less meltage) than any other system.



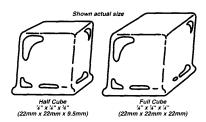
The vertical evaporator has a highly efficient freezing surface area coupled with a balanced freezing system that allows for extremely quick freezing of the water, that gives you ice in the bin faster than other models.

The 400 Series incorporates the use of a HFC refrigerant (R-404a) that provides efficient ice production without harmful CFCs.

Easy to service – all panels are easily removed with most electrical circuitry and components accessible through the front of the unit.

By stacking the units you can double the production capacity without relinquishing additional floor space (except Wallhugger series).

Half or full sized cubes – choose the size best suited for your application. (Jumbo sized cubes are available on select models.)



This series is available with an air or water cooled condenser – choose the system best suited for your application.

400 Series Cube Ice Maker



400 Series Cube Ice Maker Shown on Model B-40 Bin









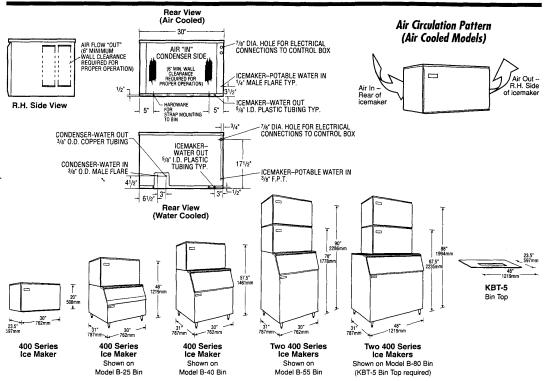








Cube Ice Maker, 400 Series



Ice Production Charts — Pounds (Kilograms) Per 24 Hours

Condensing Air Temp.			iter Temp. °F		Condensing	Air Temp.	Water Temp. °F (°C)			
Unit	°F (°C)	80° (27°)	70° (21°)	50° (10°)	Unit	°F (°C)	80° (27°)	70° (21°)	50° (10°)	
	90° (32°)	338 (153)	345 (157)	395 (179)		90° (32°)	332 (151)	369 (168)	420 (191)	
Air	80° (27°)	383 (174)	395 (179)	439 (199)	Air	80° (27°)	373 (169)	415 (188)	466 (212)	
	70° (21°)	430 (195)	439 (199)	488 (222)		70° (21°)	415 (188)	461 (209)	518 (235)	
	90° (32°)	417 (189)	449 (204)	508 (231)		90° (32°)	437 (198)	470 (213)	522 (237)	
Water	80° (27°)	424 (192)	456 (207)	518 (235)	Water	80° (27°)	455 (207)	490 (222)	544 (247)	
	70° (21°)	433 (197)	466 (212)	529 (240)	İ	70° (21°)	473 (215)	509 (231)	565 (257)	
Model Nu	mber		EC-400		Model Nu	mber		EC-405		

Ordering and Specification Information:

Model Number	Description	Cond. Unit	Cube Size	ice Production per 24 hrs. at 70° Air/50° Water Lbs. (Kgs.)	ice Production per 24 hrs. at 90° Air/70° Water Lbs. (Kgs.)	per 100	Gals. (Lits.) lbs. of Ice /76° Water Cond. Use	Kilowaits Used per 100 lbs. of Ice 90° Air 70° Water	Comp. HP	Characteristics Voltage	No. of Wires	Min. Circuit Amp.	Max. Fuse Size	Refrig. Type	Shipping Weight Lbs. (Kgs.)
EC-400F-A-P-B EC-400H-A-P-B EC-400F-W-P-B EC-400H-W-P-B	Electro-Mechanical 60 cycle voltage	Air Air Water Water	Full Half Full Half	488 (222) 488 (222) 529 (240) 529 (240)	345 (157) 345 (157) 449 (204) 449 (204)	24 (91) 24 (91) 27 (102) 27 (102)		7.2 7.2 4.7 4.7	1/2 1/2 1/2 1/2	115/60/1 115/60/1 115/60/1 115/60/1	3 3 3 3	15.2 15.2 13.4 13.4	20 A 15 A	R-404a R-404a R-404a R-404a	170 (77) 170 (77) 170 (77) 170 (77)
EC-405F-A-P-B EC-405H-A-P-B EC-405F-W-P-B EC-405H-W-P-B	Electro-Mechanical 50 cycle voltage	Air Air Water Water	Full Half Full Half	518 (235) 518 (235) 565 (257) 565 (257)	369 (168) 369 (168) 470 (213) 470 (213)	22 (83) 22 (83) 26 (98) 26 (98)	n-a n-a 140 (530) 140 (530)	8.2 8.2 4.4 4.4	3/4 3/4 3/4 3/4	240/50/1 240/50/1 240/50/1 240/50/1	3 3 3 3	12.5 12.5 10.1 10.1	15 A 15 A	R-404a R-404a R-404a R-404a	170 (77) 170 (77) 170 (77) 170 (77)
KCDS-30 KCSSP-246-B KCSSP-246-BE 1051026-01	Jumbo cube size: %" available on air cooler Stacking Kit for stacki Stainless Steel Panel Stainless Steel Panel Ice Deflector – use wi See Bin specification	d units only ng two Ser Kit for field Kit for field nen mounti	, ice ma ies 400 conver conver ng on a	ker production capac ice makers sion of Model EC-40 sion of Model EC-40 bin or dispenser othe	ity is 15-20% less) 5 er than current lce-C			nber				,			30 (14) 26 (12) 26 (12) 15 (7)

Ice-O-Matic/Mile High

11100 E. 45th Ave., Denver, CO 80239 Phone 303/371-3737, Rotary Phone 303/371-9625, FAX 303/371-6296

97-0290 1OM 4/96

SECTION 11480

ATHLETIC WALL PADDING

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-01 Data

Manufacturer's Data; AE.

Submit manufacturer's data on wall pads

SD-04 Drawings

Shop Drawings; AE.

Submit scaled shop drawings to illustrate all cutouts and their locations. Clearly detail proposed installation method.

SD-14 Samples

Wall Pad Vinyl Covering; AE.

Submit samples of all manufacturer's standard colors for selection.

SD-19 Maintenance Manuals

Maintenance and Cleaning Instructions; FIO.

Submit three copies of the wall pad manufacturer's maintenance and cleaning instructions describing the recommended type of cleaning material and method.

1.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

Deliver materials in manufacturer's original unopened containers. Provide blocking as required, store materials under cover and protect against damage. Store in a dry area between 4.4 degrees C and 37.7 degrees C.

PART 2 PRODUCTS

2.1 MATERIALS

Each pad shall consist of an inner core, foam wrapping, and vinyl covering. 2.1.1 Core Material

Core material shall be waferboard or OSB wood panels with a minimum thickness of $9.5\ \mathrm{mm}$.

2.1.2 Filler

The filler material shall be fully wrapped around the core. The filler material shall have a minimum thickness of 38 mm. Filler material shall be a 6 pound density fire resistnat neoprene compound or other 6 pound density polyurethane foam material which provides a Class A flammability rating in accordance with ASTM E84.

2.1.2.1 Inner Liner

Each pad unit shall include a "Vonar" innner liner to provide added fire resistant properties to the pad composition.

2.1.3 Vinyl Covering

Each pad unit shall be fully covered with a minimum 14 ounce per linear yard weight vinyl fabric covering. The material shall be non-linear, rip-resistant utilizing industrial polyester filament yarns, mildew resistant, rot resistant, and shall be fortified with an infection combating fungicide. The material shall have a Class A flammability rating in accordance with ASTM E84. Installed material shall contain no visible seams.

2.1.4 Dimensions

Pad height shall be a minimum of 1800 mm with varying widths as necessary to cover the entire length of each wall. Custom sizes shall be provided where necessary to wrap columns or other areas which are part of the wall construction.

PART 3 EXECUTION

3.1 INSTALLATION

Wall pads shall be installed in locations and in accordance with manufacturer's instructions and approved shop drawings using zee-bar rails and clips or other similar mounting system which allows the pads to be removed without mechanical fasteners. Added structural wall support shall be furnished to support the weight of the pads.

3.1.1 Cut Outs

Cut outs shall be provided at locations where wall mounted items appear which protrude from the wall or where access is required. Pads shall be designed and cut to template for these cut outs with all edges wrapped and finished to match the appearance and fabrication of uncut pads.

3.1.2 Surface Protection

Cover all component surfaces in plastic or paper to protect their surfaces until such time as all building construction is complete.

-- End of Section --

DIVISION 12 – FURNISHINGS

12000: Outline Specifications

Government-Edited Guide Specifications:

12690 Entrance Mats

SECTION 12000

DIVISION 12: FURNISHINGS - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 12: Furnishings:

Section 12490A, WINDOWCOVERINGS

1.1.2 Government Edited Specifications

The contractor shall incorporate the following government-supplied, fully edited specification sections as part of the project design:

Section 12690, ENTRANCE MATS

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

FEDERAL SPECIFICATIONS

FS AA-V-00200

(Rev B) Venetian Blinds

1.3 SECTION 12490A, WINDOWCOVERINGS

The contractor edited specification section shall include the following material physical characteristics and performance criteria:

1.3.1 General Description and Requirements

All exterior windows, with the exception of clerestory and vestibule windows, shall receive window blinds. Window blind type shall be horizontal "mini" blinds conforming to FS AA-V-00200, Type II, equal in design and performance to HUNTER DOUGLAS CONTRACT model CD80.

1.3.2 Material and Performance Criteria

The window blinds shall include the following minimum requirements:

- A. All components shall be metal with the exception of braided ladders.
- B. Individual component requirements shall be as follows:
 - 1) <u>Head Channel</u>. Shall be constructed of 0.61 mm corrosion-resistant steel and formed in a U-shape with rolled

edges designed to eliminate the need for a valance. All hardware shall be enclosed within the head channel.

- 2) <u>Bottom Rail</u>. Shall be constructed of 0.46 mm steel, corrosion-resistant, with baked on polyester paint. Bottom rail shall be formed with a double-lock seam into a closed oval shape with matching end caps.
- 3) <u>Slats</u>. Shall be 0.203 mm thick aluminum alloy 6011 heat treated and spring tempered, 25 mm wide. Slats shall be painted with a solid color which shall include an anti-static property to repel dust.
- 4) <u>Controls</u>. Shall include tilt and lift controls including mechanism to prevent over-tightening. Control location and design shall be such that prevents unauthorized use by children
- 5) <u>Braided Ladders</u>. Shall be composed of 100 percent polyester yarn. Spacing shall be a maximum of 29 mm and spaced to provide a minimum 15.2 slats per 305 mm drop. Spacing shall provide a uniform overlap of slats when in the closed position.
- C. All components shall match in color.

1.3.3 Installation Criteria

The window blinds shall include the following installation requirements:

A. All blinds shall be an "inside" mount style.

-- End of Section --

SECTION 12690

ENTRANCE MATS

PART 1 GENERAL

1.1 SUBMITTALS

All items designated with a "G", including product literature, calculations, component data, certificates, diagrams, drawings, and samples shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 DATA

Finishes; AE.

Accessory Items; AE.

Manufacturer's descriptive data and catalog cuts indicating materials of construction, and installation requirements.

SD-04 Drawings

Entrance Mats; AE.

Shop drawings showing layout, details, special cuts, and sections.

SD-14 Samples

Finishes; AE.

One typical section or piece of the product at least 150 mm by 150 mm showing proposed colors and finishes to include vinyl edging.

1.2 PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver products in manufacturer's packing with labels intact. Store undercover and protect against damage.

PART 2 PRODUCTS

2.1 MATERIALS

Entrance mat shall be a "free-lay", surface mounted rail type with interlocking integrated ball/socket connections between rails to facilitate roll back and cleaning. Specifications and construction shall be equal to Construction Specialties, Inc. "Pedimat" surface mounted model no. M1-M-HC-AL. Assembly shall include an aluminum block-out frame.

2.1.1 Entrance Mat

Tread rails shall be constructed of black high-impact vinyl/acrylic tread rails complete with co-extruded soft-durometer cushions. Exposed hinge rail connectors shall be extruded 60603-T6 mill finish aluminum complete with perforations for drainage. Heavy-duty carpet tread inserts to be 100% solution-dyed 6,6 nylon with a 12 mil monofilament insert for extra abrasiveness. Each carpet fiber and monofilament shall be fusion-bonded to a rigid two-ply backing to prevent fraying and supplied in continuous splice-free lengths. Carpet insert color shall be as noted on the drawings.

2.1.1.1 Durability Testing

The manufacturer shall provide testing results, either by in-house or national testing method which quantifies the durability of the mat. Test method shall be comparible to testing with a 136 kg rolling load.

2.1.2 Mat Perimeter Component

The entrance mat shall include a perimeter aluminum block-out frame to form the transition from entrance mat to the surrounding porcelain tile flooring. The frame shall be 19 mm deep composed of 6063-T6 aluminum aloy with 6 mm wide exposed surface.

PART 3 EXECUTION

3.1 INSTALLATION

Provide entrance mat assembly to areas and to dimensions as indicated on the drawings. Installation of entrance mat shall be free-lay to allow for removal and cleaning of sub-floor. Installation shall include latex leveling screed by installer to ensure level base for the aluminum frame. Black vinyl fillers shall be furnished where standard 51 mm tread spacing cannot be maintained.

-- End of Section --

DIVISION 13 - SPECIAL CONSTRUCTION

13000: Outline Specifications

Government-Edited Guide Specifications:

13080 Seismic Protection for Miscellaneous Equipment
13930 Wet Pipe Sprinkler System, Fire Protection
13965 Wet Chemical Fire Extinguishing System

SECTION 13000

DIVISION 13 SPECIAL CONSTRUCTION: - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 13: Special Construction:

Section 13080, SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT

Section 13110, CATHODIC PROTECTION SYSTEM

Section 13851, FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE

Section 13930A, WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION

1.2 SECTION 13110, CATHODIC PROTECTION SYSTEM

The edited specification shall include the following requirements for material criteria:

1.2.1 General Requirements

Cathodic protect is required for all underground metallic pipes and conduits. Protection shall use a sacrificial annode type system.

1.3 SECTION 13851, FIRE DETECTION AND ALARM SYSTEM, ADDRESABLE

1.3.1 General Requirements

- A. The fire alarm system shall be an addressible system. The system shall be SLC Style 5, with style Z indicating devices.
- B. The battery backup for the alarm system shall be sufficiently sized for 48 hours operation.
- C. The control panel is located in the DOIM communications room with a switch that will shutdown the entire HVAC System.
- D. A Monaco D-700 Transciever will be installed in the communications room.

1.4 SECTION 13930A, WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION

This guide specification is a preformance specification, which covers the requirements for wet pipe fire protection sprinkler systems. This section

is primarily intended for performance designed systems in accordance with Military Handbook 1008C, i.e., systems where the size, layout, and support of branch lines and cross mains, and the layout of sprinkler heads shall be designed by the Contractor. The design shall be preformed and reviewed through the design process of the contract. The specification shall be edited to remove the design requirements. (Note that the design requirements are part of the contract as specified in Section 01018, FIRE PROTECTION REQUIREMENTS).

1.4.1 Hydraulic Design

Hydraulic Design requirements shall be deleted from the project specification. The following items shall be retained in the project specification:

1.4.1.1 Minimum Pipe Size

The minimum pipe size for branch lines in gridded systems shall be 32 mm .

1.4.1.2 Maximum Water Velocity

Water velocity in the piping shall not exceed 6 m/s.

1.4.1.3 Sprinkler Spacing

Maximum sprinkler spacing requirements shall be retained in the project specification.

1.4.2 General Requirements

All other general requirements shall be retained in the project specification.

1.4.3 Protection of Electrical Equipment

Add the following requirements to the project specifications; "Sprinkler piping, including pipe, valves, sprinkler heads, fittings, and appurtenances, shall not be routed above switchboards or panelboards unless the piping is installed at least 25 feet above the finished floor or above the next higher floor elevation."

1.4.4 Sprinklers Material Requirements

Add the following requirements to the material requirements for sprinklers in the project specifications; "Sprinklers shall conform to UL-04 for required application and shall be upright, pendent, sidewall or other type as indicated. Sprinklers installed in areas with finished ceilings shall be nickel or chrome plated and shall be provided with the manufacturer's matching nickel or chrome plated escutcheon."

1.4.5 Sprinklers Installation Requirements

Add the following requirements to the installation requirements for sprinklers in the project specifications; "Sprinklers shall be the type as required for the application. Automatic and open type sprinklers shall be placed upright unless otherwise indicated, with the deflector parallel to the ceiling or slope of the roof. Clearances between deflectors and ceiling, roof decking, roof joists, and electric or heating equipment or other obstructions shall be in accordance with NFPA 13. Where sprinklers

and escutcheons are installed in conjunction with finished ceilings, the sprinklers and matching escutcheons shall be installed in accordance with the manufacturer's recommendations. Coated sprinklers shall be coated with wax and installed as indicated."

-- End of Section --

SECTION 13080

SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 53	(1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 153/A 153M	(1998) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 307	(1997) Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A 325M	(1997) High-Strength Bolts for Structural Steel Joints (Metric)
ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 563	(1997) Carbon and Alloy Steel Nuts
ASTM A 572/A 572M	(1999) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 603	(1998) Zinc-Coated Steel Structural Wire Rope
ASTM A 653/A 653M	(1999) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM E 488	(1996) Strength of Anchors in Concrete and Masonry Elements
ASME INTERNATIONAL (ASM	IE)
ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1999) Square and Hex Nuts (Inch Series)

U.S. ARMY CORPS OF ENGINEERS (USACE)

TI 809-04 (1998) Seismic Design for Buildings

1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

The requirements for seismic protection measures described in this section shall be applied to the mechanical equipment and systems outlined in Section 15070 SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT, the electrical equipment and systems outlined in Section 16070 SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT, and the miscellaneous equipment and systems listed below. Seismic protection requirements shall be in accordance with TI 809-04 and additional data furnished by the Contracting Officer, and shall be provided in addition to any other requirements called for in other sections of these specifications. The design for seismic protection shall be based on a Seismic Use Group [I] [II] [IIIH] [IIIE] building occupancy and on site response coefficients for S_{MS} = [____] and S_{M1} = [____]. Resistance to lateral forces induced by earthquakes shall be accomplished without consideration of friction resulting from gravity loads. The basic force formulas, for Ground Motions A and B in Chapter 3 of TI 809-04, use the design spectral response acceleration parameters for the performance objective of the building, not for equipment in the building; therefore, corresponding adjustments to the formulas shall be required.

1.2.2 Miscellaneous Equipment and Systems

The bracing for the following miscellaneous equipment and systems shall be developed by the [A-E] [Contractor] in accordance with the requirements of this specification:

Storage	cabinets
Storage	Racks
Shelving	3
Partitio	ons

Orname	entat	cions					
Signs	and	Billboards					
Furnishings							
Γ	1						

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Bracing;	[],[_]			
Resilient	Vibration	Isolation	Devices;	[],	[]
Equipment	Requiremen	nts; [_], [_]	

Detail drawings along with catalog cuts, templates, and erection and installation details, as appropriate, for the items listed. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal, and dimensions; and shall show construction details, reinforcement, anchorage, and installation with relation to the building construction. For equipment and systems in buildings that have a performance objective higher than life-safety, the drawings shall be stamped by the registered engineer who stamps the calculations required above.

SD-03 Product Data

Bracing;	G,	[]			
Equipment	Re	equirements;	G,	[]

Copies of the design calculations with the detail drawings. Calculations shall be stamped by a registered engineer and shall verify the capability of structural members to which bracing is attached for carrying the load from the brace.

1.4 EQUIPMENT REQUIREMENTS

1.4.1 Rigidly Mounted Equipment

The following specific items of equipment: [____] to be furnished under this contract shall be constructed and assembled to withstand the seismic forces specified in TI 809-04, Chapter 10. For any rigid equipment which is rigidly attached on both sides of a building expansion joint, flexible joints for piping, electrical conduit, etc., that are capable of accommodating displacements equal to the full width of the joint in both orthogonal directions, shall be provided.

1.4.2 Nonrigid or Flexibly-Mounted Equipment

The following specific items of equipment to be furnished: [____] shall be constructed and assembled to resist a horizontal lateral force of [____] times the operating weight of the equipment at the vertical center of gravity of the equipment.

PART 2 PRODUCTS

2.1 BOLTS AND NUTS

Squarehead and hexhead bolts, and heavy hexagon nuts, ASME B18.2.1, ASME B18.2.2, or [ASTM A 307 for bolts and ASTM A 563 for nuts] [ASTM A 325M for bolts and nuts]. Bolts and nuts used underground and/or exposed to weather shall be galvanized in accordance with ASTM A 153/A 153M.

2.2 SWAY BRACING

Material used for members listed [in this section] [and] [on the drawings], shall be structural steel conforming with the following:

- a. Plates, rods, and rolled shapes, [ASTM A 36/A 36M] [ASTM A 572/A 572M, Grade 503]. If the Contractor does the design, both ASTM A 36/A 36Mand ASTM A 572/A 572M, grade 503 will be allowed.
- b. Wire rope, ASTM A 603.
- c. Tubes, ASTM A 500, Grade [B] [____].
- d. Pipes, ASTM A 53, Type [E] or [S], Grade B.
- e. Light gauge angles, less than 6 mm thickness, [ASTM A 653/A 653M] $[___]$.

PART 3 EXECUTION

3.1 BRACING

Bracing shall conform to the arrangements shown. Trapeze-type hanger shall be secured with not less than two 13 mm bolts.

3.2 BUILDING DRIFT

Sway braces for a piping run shall not be attached to two dissimilar structural elements of a building that may respond differentially during an earthquake unless a flexible joint is provided.

3.3 ANCHOR BOLTS

3.3.1 Cast-In-Place

Floor or pad mounted equipment shall use cast-in-place anchor bolts, except as specified below. [One nut] [Two nuts] shall be provided on each bolt. Anchor bolts shall conform to ASTM A 307. Anchor bolts shall have an embedded straight length equal to at least 12 times nominal diameter of the bolt. Anchor bolts that exceed the normal depth of equipment foundation piers or pads shall either extend into concrete floor or the foundation shall be increased in depth to accommodate bolt lengths.

3.3.2 Expansion or Chemically Bonded Anchors

Expansion or chemically bonded anchors shall not be used unless test data in accordance with ASTM E 488 has been provided to verify the adequacy of the specific anchor and application. Expansion or chemically bonded anchors shall not be used to resist pull-out in overhead and wall installations if the adhesive is manufactured with temperature sensitive epoxies and the location is accessible to a building fire. Expansion and chemically bonded anchors shall be installed in accordance with the manufacturer's recommendations. The allowable forces shall be adjusted for the spacing between anchor bolts and the distance between the anchor bolt and the nearest edge, as specified by the manufacturer.

3.3.2.1 General Testing

Expansion and chemically bonded anchors shall be tested in place after installation. The tests shall occur not more than [24] [____] hours after installation of the anchor and shall be conducted by an independent testing agency; testing shall be performed on random anchor bolts as described below.

3.3.2.2 Torque Wrench Testing

Torque wrench testing shall be done on not less than [50] [____] percent of the total installed expansion anchors and at least [one anchor] [[____] anchors] for every piece of equipment containing more than [two] [____] anchors. The test torque shall equal the minimum required installation torque as required by the bolt manufacturer. Torque wrenches shall be calibrated at the beginning of each day the torque tests are performed. Torque wrenches shall be recalibrated for each bolt diameter whenever tests are run on bolts of various diameters. The applied torque shall be between 20 and 100 percent of wrench capacity. The test torque shall be reached within one half turn of the nut, except for 9 mm sleeve anchors which shall reach their torque by one quarter turn of the nut. If any anchor fails the test, similar anchors not previously tested shall be tested until

[20] [____] consecutive anchors pass. Failed anchors shall be retightened and retested to the specified torque; if the anchor still fails the test it shall be replaced.

3.3.2.3 Pullout Testing

Expansion and chemically bonded anchors shall be tested by applying a pullout load using a hydraulic ram attached to the anchor bolt. At least [5] [____] percent of the anchors, but not less than [3] [____] per day shall be tested. The load shall be applied to the anchor without removing the nut; when that is not possible, the nut shall be removed and a threaded coupler shall be installed of the same tightness as the original nut. The test setup shall be checked to verify that the anchor is not restrained from withdrawing by the baseplate, the test fixture, or any other fixtures. The support for the testing apparatus shall be at least 1.5 times the embedment length away from the bolt being tested. Each tested anchor shall be loaded to [1] [____] times the design tension value for the anchor. The anchor shall have no observable movement at the test load. If any anchor fails the test, similar anchors not previously tested shall be tested until [20] [____] consecutive anchors pass. Failed anchors shall be retightened and retested to the specified load; if the anchor still fails the test it shall be replaced.

3.4 RESILIENT VIBRATION ISOLATION DEVICES

Where the need for these devices is determined, based on the magnitude of the design seismic forces, selection of anchor bolts for vibration isolation devices and/or snubbers for equipment base and foundations shall follow the same procedure as in paragraph ANCHOR BOLTS, except that an equipment weight equal to [five] [____] times the actual equipment weight shall be used.

3.4.1 Resilient and Spring-Type Vibration Devices

Vibration isolation devices shall be selected so that the maximum movement of equipment from the static deflection point shall be 13 mm.

3.4.2 Multidirectional Seismic Snubbers

Multidirectional seismic snubbers employing elastomeric pads shall be installed on floor- or slab-mounted equipment. These snubbers shall provide 6 mm free vertical and horizontal movement from the static deflection point. Snubber medium shall consist of multiple pads of cotton duct and neoprene or other suitable materials arranged around a flanged steel trunnion so both horizontal and vertical forces are resisted by the snubber medium.

3.5 SWAY BRACES FOR PIPING

Transverse sway bracing for steel and copper pipe shall be provided at intervals not to exceed those shown on the drawings. Transverse sway bracing for pipes of materials other than steel and copper shall be provided at intervals not to exceed the hanger spacing as specified in Section 15400 PLUMBING, GENERAL PURPOSE. Bracing shall consist of at least one vertical angle 50 x 50 mm x 16 gauge and one diagonal angle of the same size.

3.5.1 Longitudinal Sway Bracing

Longitudinal sway bracing shall be provided in accordance with Section 15070 SEISMIC CONTROL FOR MECHANICAL EQUIPMENT.

3.5.2 Anchor Rods, Angles, and Bars

Anchor rods, angles, and bars shall be bolted to either pipe clamps or pipe flanges at one end and cast-in-place concrete or masonry insert or clip angles bolted to the steel structure on the other end. Rods shall be solid metal or pipe as specified below. Anchor rods, angles, and bars shall not exceed lengths given in the tabulation below.

3.5.3 Maximum Length for Anchor Braces

Type	Size (millimeters)	Maximum Length* (meters)
Angles	38 x 38 x 6 50 x 50 x 6 64 x 38 x 6 75 x 64 x 6 75 x 75 x 6	1.5 2.0 2.5 2.5 3.0
Rods	91 22	1.0 1.0
Flat Bars	38 x 6 50 x 6 50 x 10	0.4 0.4 0.5
Pipes (40s)	25 32 40 50	2.0 2.8 3.2 4.0

3.5.4 Bolts

Bolts used for attachment of anchors to pipe and structure shall be not less than $13\ \mathrm{mm}$ diameter.

3.6 EQUIPMENT SWAY BRACING

3.6.1 Suspended Equipment and Light Fixtures

Equipment sway bracing shall be provided for items supported from overhead floor or roof structural systems, including light fixtures. Braces shall consist of angles, rods, wire rope, bars, or pipes arranged as shown and secured at both ends with not less than 13 mm bolts. Sufficient braces shall be provided for equipment to resist a horizontal force equal to [____] times the weight of equipment without exceeding safe working stress of bracing components. Details of equipment bracing shall be submitted for acceptance. In lieu of bracing with vertical supports, these items may be supported with hangers inclined at 45 degrees directed up and radially away from equipment and oriented symmetrically in 90-degree intervals on the horizontal plane, bisecting the angles of each corner of the equipment, provided that supporting members are properly sized to support operating weight of equipment when hangers are inclined at a 45-degree angle.

3.6.2 Floor or Pad Mounted Equipment

3.6.2.1 Shear Resistance

Floor mounted equipment shall be bolted to the floor. Requirements for the number and installation of bolts to resist shear forces shall be in accordance with paragraph ANCHOR BOLTS.

3.6.2.2 Overturning Resistance

The ratio of the overturning moment from seismic forces to the resisting moment due to gravity loads shall be used to determine if overturning forces need to be considered in the sizing of anchor bolts. Calculations shall be provided to verify the adequacy of the anchor bolts for combined shear and overturning.

3.7 SPECIAL INSPECTION AND TESTING FOR SEISMIC-RESISTING SYSTEMS

Special inspections and testing for seismic-resisting systems and components shall be done in accordance with Section 01452 SPECIAL INSPECTION FOR SEISMIC-RESISTING SYSTEMS.

-- End of Section --

SECTION 13930A

WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 135 (2001) Electric-Resistance-Welded Steel Pipe
ASTM A 183 (1998) Carbon Steel Track Bolts and Nuts

ASTM A 193/A 193M (2001a) Alloy-Steel and Stainless Steel Bolting Materials for

High-Temperature Service

ASTM A 449 (2000) Quenched and Tempered Steel Bolts and Studs

ASTM A 47/A 47M (1999) Ferritic Malleable Iron Castings

ASTM A 53/A 53M (2001) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and

Seamless

ASTM A 536 (1984; R 1999el) Ductile Iron Castings

ASTM A 563M (2000) Carbon and Alloy Steel Nuts (Metric)

ASTM A 795 (2000) Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and

Seamless Steel Pipe for Fire Protection Use

ASTM B 62 (1993) Composition Bronze or Ounce Metal Castings

ASTM B 75M (1999) Seamless Copper Tube (Metric)

ASTM B 88M (1999) Seamless Copper Water Tube (Metric)

ASTM D 2000 (1999) Rubber Products in Automotive Applications

ASTM F 436M (1993) Hardened Steel Washers (Metric)

ASTM F 442/F 442M (1999) Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1015 (1999) Double Check Backflow Prevention Assembly

AMERICAN WATER WORKS ASSOCIATION(AWWA)

AWWA B300 (1999) Hypochlorites

AWWA B301 (1992; Addenda B301a - 1999) Liquid Chlorine

AWWA C104 (1995) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

AWWA C110 (1998) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm

through 1200 mm), for Water and Other Liquids

AWWA C111 (2000) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

AWWA C151 (1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids

AWWA C203 (1997; Addenda C203a - 1999) Coal-Tar Protective Coatings and Linings

for Steel Water Pipelines - Enamel and Tape - Hot-Applied

AWWA C606 (1997) Grooved and Shouldered Joints

AWWA EWW (1999) Standard Methods for the Examination of Water and Wastewater

AWWA M20 (1973) Manual: Water Chlorination Principles and Practices

ASME INTERNATIONAL (ASME)

ASME B16.1 (1998) Cast Iron Pipe Flanges and Flanged Fittings

ASME B16.11 (1996) Forged Fittings, Socket-Welding and Threaded

ASME B16.18 (1984; R 1994) Cast Copper Alloy Solder Joint Pressure Fittings

ASME B16.21 (1992) Nonmetallic Flat Gaskets for Pipe Flanges

ASME B16.22 (1995; B16.22a1998) Wrought Copper and Copper Alloy Solder Joint

Pressure Fittings

ASME B16.26 (1988) Cast Copper Alloy Fittings for Flared Copper Tubes

ASME B16.3 (1998) Malleable Iron Threaded Fittings

ASME B16.4 (1998) Gray Iron Threaded Fittings

ASME B16.9 (1993) Factory-Made Wrought Steel Buttwelding Fittings

ASME B18.2.1 (1996) Square and Hex Bolts and Screws (Inch Series)

ASME B18.2.2 (1987; R 1993) Square and Hex Nuts (Inch Series)

FACTORY MUTUAL ENGINEERING AND RESEARCH (FM)

FM P7825a (1998) Approval Guide Fire Protection

FM P7825b (1998) Approval Guide Electrical Equipment

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-71 (1997) Gray Iron Swing Check Valves, Flanges and Threaded Ends

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 13 (1999) Installation of Sprinkler Systems

NFPA 13R (1999) Installation of Sprinkler Systems in Residential Occupancies Up to

and Including Four Stories in Height

NFPA 1963 (1998) Fire Hose Connections

NFPA 230 (1999) Fire Protection of Storage

NFPA 24 (1995) Installation of Private Fire Service Mains and Their Appurtenances

NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES (NICET)

NICET 1014-7 (1995) Program Detail Manual for Certification in the Field of Fire

Protection Engineering Technology (Field Code 003) Subfield of

Automatic Sprinkler System Layout

UNDERWRITERS LABORATORIES (UL)

UL 668 (1995; Rev thru Dec 1998) Hose Valves for Fire Protection Service

UL Bld Mat Dir (1999) Building Materials Directory

UL Fire Prot Dir (1999) Fire Protection Equipment Directory

1.2 GENERAL REQUIREMENTS

Wet pipe sprinkler system shall be provided in [all areas of the building] [areas indicated on the drawings] [_____]. The sprinkler system shall provide fire sprinkler protection for the entire area. Except as modified herein, the system shall be designed and installed in accordance with [NFPA 13] [NFPA 13R]. Rack sprinklers shall be in accordance with NFPA 230. Pipe sizes which are not indicated on drawings shall be determined by hydraulic calculation. The Contractor shall design any portions of the sprinkler system that are not indicated on the drawings including locating sprinklers, piping and equipment, and size piping and equipment when this information is not indicated on the drawings or is not specified herein. The design of the sprinkler system shall be based on hydraulic calculations, and the other provisions specified herein.

1.2.1 Hydraulic Design

The system shall be hydraulically designed to discharge a minimum density of [____] L/min per square meter over the hydraulically most demanding [280] [____] square meters of floor area. The minimum pipe size for branch lines in gridded systems shall be 32 mm . Hydraulic calculations shall be in accordance with the Area/Density Method of NFPA 13. Water velocity in the piping shall not exceed 6 m/s .

1.2.1.1 Hose Demand

An allowance for exterior hose streams of [____] L/min shall be added to the sprinkler system demand [at the fire hydrant shown on the drawings closest to the point where the water service enters the building] [at the point of connection to the existing system]. [An allowance for interior hose stations of [____] L/min shall also be added to the sprinkler system demand.]

1.2.1.2 Basis for Calculations

The design of the system shall be based upon a water supply with a static pressure of [____], and a flow of [____] at a residual pressure of [____]. Water supply shall be presumed available [at the point of connection to existing] [at the base of the riser] [____]. Hydraulic calculations shall be based upon the Hazen-Williams formula with a "C" value of 120 for steel piping, 150 for copper tubing, 140 for new cement-lined ductile-iron piping, and [100] [____] for existing underground piping. [Hydraulic calculations shall be based on operation of the fire pump(s) provided in Section 13920A FIRE PUMPS]

1.2.2 Sprinkler Spacing

Sprinklers shall be uniformly spaced on branch lines. Maximum spacing per sprinkler shall not exceed [[____] square meters] [limits specified in NFPA 13 for [light] [ordinary] [extra] hazard occupancy.]

1.3 COORDINATION OF TRADES

Piping offsets, fittings, and any other accessories required shall be furnished as required to provide a complete installation and to eliminate interference with other construction. Sprinkler shall be installed over and under ducts, piping and platforms when such equipment can negatively effect or disrupt the sprinkler discharge pattern and coverage.

1.4 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be housed in a manner to preclude any damage from the weather, humidity and temperature variations, dirt and dust, or other contaminants. Additionally, all pipes shall either be capped or plugged until installed.

1.5 FIELD MEASUREMENTS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES::

SD-02 Shop Drawings

S	orinkler	System	Shop	Drawings	; ;	G.	Γ	1
\sim		Dybcciii	DIIOP	DIAWINGS	, ,	U ,	L	

[Three] [_____] copies of the Sprinkler System Shop Drawings, no later than [21] [_____] days prior to the start of sprinkler system installation. The Sprinkler System Shop Drawings shall conform to the requirements established for working plans as prescribed in NFPA 13. Drawings shall include plan and elevation views demonstrating that the equipment will fit the allotted spaces with clearance for installation and maintenance. Each set of drawings shall include the following:

- a. Descriptive index of drawings in the submittal with drawings listed in sequence by drawing number. A legend identifying device symbols, nomenclature, and conventions used.
- b. Floor plans drawn to a scale not less than 1:100 which clearly show locations of sprinklers, risers, pipe hangers, seismic separation assemblies, sway bracing, inspector's test connections, drains, and other applicable details necessary to clearly describe the proposed arrangement. Each type of fitting used and the locations of bushings, reducing couplings, and welded joints shall be indicated.
- c. Actual center-to-center dimensions between sprinklers on branch lines and between branch lines; from end sprinklers to adjacent walls; from walls to branch lines; from sprinkler feed mains, cross-mains and branch lines to finished floor and roof or ceiling. A detail shall show the dimension from the sprinkler and sprinkler deflector to the ceiling in finished areas.
- d. Longitudinal and transverse building sections showing typical branch line and cross-main pipe routing as well as elevation of each typical sprinkler above finished floor.
 - e. Details of each type of riser assembly; pipe hanger; sway

	water main at point-of-entry into the building, and electrical devices and interconnecting wiring.
	As-Built Shop Drawings; [], [].
	As-built shop drawings, at least [14] [] days after completion of the Final Tests. The Sprinkler System Drawings shall be updated to reflect as-built conditions after all related work is completed and shall be on reproducible full-size mylar film.
SD-0	3 Product Data
	Fire Protection Related Submittals; [], [].
	A list of the Fire Protection Related Submittals, no later than [7] [] days after the approval of the Fire Protection Specialist.
	Load Calculations for Sizing Sway Bracing; G, [].
	For systems that are required to be protected against damage from earthquakes, load calculations shall be provided for sizing of sway bracing.
	Components and Equipment Data; G, [].
	Manufacturer's catalog data included with the Sprinkler System Drawings for all items specified herein. The data shall be highlighted to show model, size, options, etc., that are intended for consideration. Data shall be adequate to demonstrate compliance with all contract requirements. In addition, a complete equipment list that includes equipment description, model number and quantity shall be provided.
	Hydraulic Calculations; G, [].
	Hydraulic calculations, including a drawing showing hydraulic reference points and pipe segments.
	Spare Parts; [], [].
	Spare parts data shall be included for each different item of material and equipment specified. The data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of parts recommended by the manufacturer to be replaced after 1 year and 3 years of service. A list of special tools and test equipment required for maintenance and testing of the products supplied by the Contractor shall be included.
	Preliminary Tests Procedures; G, [].
	Proposed procedures for Preliminary Tests, no later than [14] [] days prior to the proposed start of the tests.
	Final Acceptance Test Procedures; G, [].

bracing for earthquake protection, and restraint of underground

[14] [] days prior to the proposed start of the tests.						
On-site Training Schedule; G, [].						
Proposed On-site Training schedule, at least 14 [] days prior to the start of related training.						
Preliminary Tests; G, [].						
Proposed date and time to begin Preliminary Tests, submitted with the Preliminary Tests Procedures.						
Final Acceptance Test; G, [].						
Proposed date and time to begin Final Acceptance Test, submitted with the Final Acceptance Test Procedures. Notification shall be provided at least [14] [] days prior to the proposed start of the test. Notification shall include a copy of the Contractor's Material & Test Certificates.						
Fire Protection Specialist Qualifications; G; [].						
The name and documentation of certification of the proposed Fire Protection Specialists, no later than 14 days [] after the Notice to Proceed and prior to the submittal of the sprinkler system drawings and hydraulic calculations.						
Sprinkler System Installer Qualifications; G, [].						
The name and documentation of certification of the proposed Sprinkler System Installer, concurrent with submittal of the Fire Protection Specialist Qualifications.						
SD-06 Test Reports						
Preliminary Tests Report; G; [].						
[Three] [] copies of the completed Preliminary Tests Reports, no later that [7] [] days after the completion of the Preliminary Tests. The Preliminary Tests Report shall include both the Contractor's Material and Test Certificate for Underground Piping and the Contractor's Material and Test Certificate for Aboveground Piping. All items in the Preliminary Tests Report shall be signed by the Fire Protection Specialist.						
Final Acceptance Test Report; G, [].						
[Three] [] copies of the completed Final Acceptance Tests Reports, no later that [7] [] days after the completion of the Final Acceptance Tests. All items in the Final Acceptance Report shall be signed by the Fire Protection Specialist.						
SD-07 Certificates						
Fire Protection Specialist Inspection; G, [].						
Concurrent with the Final Acceptance Test Report, certification by the Fire Protection Specialist that the sprinkler system is						

installed in accordance with the contract requirements, including signed approval of the Preliminary and Final Acceptance Test Reports.

SD-10 Operation and Maintenance Data

Wet	Pine	Sprinkler	System:	Γ	1	Γ	1
$M \subset C$	FTPC	phrimmer	System/	L	J ,	L	J .

[Six] [_____] manuals listing step-by-step procedures required for system startup, operation, shutdown, and routine maintenance, at least 14 days [_____] prior to field training. The manuals shall include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance including the name of a local supplier, simplified wiring and controls diagrams, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment. [Each service organization submitted shall be capable of providing [4] [____] hour on-site response to a service call on an emergency basis.]

1.7 HYDRAULIC CALCULATIONS

Hydraulic calculations shall be as outlined in NFPA 13 except that calculations shall be performed by computer using software intended specifically for fire protection system design using the design data shown on the drawings. Software that uses k-factors for typical branch lines is not acceptable. Calculations shall be based on the water supply data shown on the drawings. Calculations shall substantiate that the design area used in the calculations is the most demanding hydraulically. Water supply curves and system requirements shall be plotted on semi-logarithmic graph paper so as to present a summary of the complete hydraulic calculation. A summary sheet listing sprinklers in the design area and their respective hydraulic reference points, elevations, actual discharge pressures and actual flows shall be provided. Elevations of hydraulic reference points (nodes) shall be indicated. Documentation shall identify each pipe individually and the nodes connected thereto. The diameter, length, flow, velocity, friction loss, number and type fittings, total friction loss in the pipe, equivalent pipe length and Hazen-Williams coefficient shall be indicated for each pipe. For gridded systems, calculations shall show peaking of demand area friction loss to verify that the hydraulically most demanding area is being used. Also for gridded systems, a flow diagram indicating the quantity and direction of flows shall be included. A drawing showing hydraulic reference points (nodes) and pipe designations used in the calculations shall be included and shall be independent of shop drawings.

1.8 FIRE PROTECTION SPECIALIST

Work specified in this section shall be performed under the supervision of and certified by the Fire Protection Specialist. The Fire Protection Specialist shall be an individual who is a registered professional engineer and a Full Member of the Society of Fire Protection Engineers or who is certified as a Level [III] [IV] Technician by National Institute for Certification in Engineering Technologies (NICET) in the Automatic Sprinkler System Layout subfield of Fire Protection Engineering Technology in accordance with NICET 1014-7. The Fire Protection Specialist shall be regularly engaged in the design and installation of the type and complexity of system specified in the Contract documents, and shall have served in a similar capacity for at least three systems that have performed in the

manner intended for a period of not less than 6 months.

1.9 SPRINKLER SYSTEM INSTALLER QUALIFICATIONS

Work specified in this section shall be performed by the Sprinkler System Installer. The Sprinkler System Installer shall be regularly engaged in the installation of the type and complexity of system specified in the Contract documents, and shall have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

1.10 REGULATORY REQUIREMENTS

Compliance with referenced NFPA standards is mandatory. This includes advisory provisions listed in the appendices of such standards, as though the word "shall" had been substituted for the word "should" wherever it appears. In the event of a conflict between specific provisions of this specification and applicable NFPA standards, this specification shall govern. Reference to "authority having jurisdiction" shall be interpreted to mean the Contracting Officer.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

2.2 NAMEPLATES

All equipment shall have a nameplate that identifies the manufacturer's name, address, type or style, model or serial number, and catalog number.

2.3 REQUIREMENTS FOR FIRE PROTECTION SERVICE

Materials and Equipment shall have been tested by Underwriters Laboratories, Inc. and listed in UL Fire Prot Dir or approved by Factory Mutual and listed in FM P7825a and FM P7825b. Where the terms "listed" or "approved" appear in this specification, such shall mean listed in UL Fire Prot Dir or FM P7825a and FM P7825b

2.4 UNDERGROUND PIPING COMPONENTS

2.4.1 Pipe

Piping from a point 150 mm above the floor to [a point 1500 mm outside the building wall] [the point of connection to the existing water mains] shall be ductile iron with a rated working pressure of [1034] [1207] [____] kPa conforming to AWWA C151, with cement mortar lining conforming to AWWA C104. Piping more than 1500 mm outside the building walls shall comply with Section 02510A WATER DISTRIBUTION SYSTEM.

2.4.2 Fittings and Gaskets

Fittings shall be ductile iron conforming to AWWA C110. Gaskets shall be suitable in design and size for the pipe with which such gaskets are to be used. Gaskets for ductile iron pipe joints shall conform to AWWA C111.

2.4.3 Gate Valve and Indicator Posts

Gate valves for underground installation shall be of the inside screw type with counter-clockwise rotation to open. Where indicating type valves are shown or required, indicating valves shall be gate valves with an approved indicator post of a length to permit the top of the post to be located 900 mm above finished grade. Gate valves and indicator posts shall be listed in UL Fire Prot Dir or FM P7825a and FM P7825b.

2.5 ABOVEGROUND PIPING COMPONENTS

Aboveground piping shall be steel [or copper] [, copper, or plastic].

2.5.1 Steel Piping Components

2.5.1.1 Steel Pipe

Except as modified herein, steel pipe shall be [black] [galvanized] [galvanized where indicated] as permitted by NFPA 13 and shall conform to applicable provisions of ASTM A 795, ASTM A 53/A 53M, or ASTM A 135. Pipe in which threads or grooves are cut shall be Schedule 40 or shall be listed by Underwriters' Laboratories to have a corrosion resistance ratio (CRR) of 1.0 or greater after threads or grooves are cut. Pipe shall be marked with the name of the manufacturer, kind of pipe, and ASTM designation.

2.5.1.2 Fittings for Non-Grooved Steel Pipe

Fittings shall be cast iron conforming to ASME B16.4, steel conforming to ASME B16.9 or ASME B16.11, or malleable iron conforming to ASME B16.3. [Steel press fittings shall be approved for fire protection systems.] Galvanized fittings shall be used for piping systems or portions of piping systems utilizing galvanized piping. Fittings into which sprinklers, drop nipples or riser nipples (sprigs) are screwed shall be threaded type. Plain-end fittings with mechanical couplings, fittings that use steel gripping devices to bite into the pipe and segmented welded fittings shall not be used.

2.5.1.3 Grooved Mechanical Joints and Fittings

Joints and fittings shall be designed for not less than 1200 kPa service and shall be the product of the same manufacturer; segmented welded fittings shall not be used. Fitting and coupling houses shall be malleable iron conforming to ASTM A 47/A 47M, Grade 32510; ductile iron conforming to ASTM A 536, Grade 65-45-12. Gasket shall be the flush type that fills the entire cavity between the fitting and the pipe. Nuts and bolts shall be heat-treated steel conforming to ASTM A 183 and shall be cadmium plated or zinc electroplated.

2.5.1.4 Flanges

Flanges shall conform to NFPA 13 and ASME B16.1. Gaskets shall be non-asbestos compressed material in accordance with ASME B16.21, 1.6 mm thick, and full face or self-centering flat ring type.

2.5.1.5 Bolts, Nut, and Washers

Bolts shall be [squarehead conforming to ASME B18.2.1] [ASTM A 449, Type [1] [2]] and shall extend no less than three full threads beyond the nut with bolts tightened to the required torque. Nuts shall be [hexagon type conforming to ASME B18.2.2] [

ASTM A 193/A 193M, Grade 5] [ASTM A 563M, Grade [C3] [DH3]]. Washers shall meet the requirements of ASTM F 436M. Flat circular washers shall be provided under all bolt heads and nuts.

2.5.2 Copper Tube Components

2.5.2.1 Copper Tube

Copper tube shall conform to ASTM B 88M , Types L and M.

2.5.2.2 Copper Fittings and Joints

Cast copper alloy solder-joint pressure fittings shall conform to ASME B16.18 and wrought copper and bronze solder-joint pressure fittings shall conform to ASME B16.22 and ASTM B 75M. Cast copper alloy fittings for flared copper tube shall conform to ASME B16.26 and ASTM B 62. Brass or bronze adapters for brazed tubing may be used for connecting tubing to flanges and to threaded ends of valves and equipment. Extracted brazed tee joints produced with an acceptable tool and installed as recommended by the manufacturer may be used. Grooved mechanical joints and fittings shall be designed for not less than 862 kPa service and shall be the product of the same manufacturer. Grooved fitting and mechanical coupling housing shall be ductile iron conforming to ASTM A 536. Gaskets for use in grooved joints shall be molded synthetic polymer of pressure responsive design and shall conform to ASTM D 2000 for circulating medium up to 110 degrees C. Grooved joints shall conform to AWWA C606. Coupling nuts and bolts for use in grooved joints shall be steel and shall conform to ASTM A 183

2.5.3 Plastic Piping Components

2.5.3.1 Plastic Pipe

Plastic pipe shall be chlorinated polyvinyl chloride (CPVC) conforming to ASTM F 442/F 442M, 1207 kPa rating and listed in UL Fire Prot Dir for use in wet pipe sprinkler systems.

2.5.3.2 Plastic Fittings

Plastic fitting shall be chlorinated polyvinyl chloride (CPVC) as listed in UL Fire Prot Dir for use in wet pipe sprinkler systems.

2.5.4 Pipe Hangers

Hangers shall be listed in UL Fire Prot Dir or FM P7825a and FM P7825b and of the type suitable for the application, construction, and pipe type and sized to be supported.

2.5.5 Valves

2.5.5.1 Control Valve and Gate Valve

Manually operated sprinkler control valve and gate valve shall be outside stem and yoke (OS&Y) type and shall be listed in UL Bld Mat Dir or FM P7825a and FM P7825b.

2.5.5.2 Check Valve

Check valve 50 mm and larger shall be listed in UL Bld Mat Dir or FM P7825a and FM P7825b. Check valves 100 mm and larger shall be of the swing type with flanged cast iron body and flanged inspection plate, shall have a clear waterway and shall meet the requirements of MSS SP-71, for Type 3 or 4.

2.5.5.3 Hose Valve

Valve shall comply with UL 668 and shall have a minimum rating of 2070 kPa. Valve shall be non-rising stem, all bronze, 90 degree angle type, with 65 mm American National Standard Fire Hose Screw Thread (NH) male outlet in accordance with NFPA 1963. Hose valve shall be provided with 65 to 40 mm reducer. Hose valves shall be equipped with lugged cap with drip drain, cap gasket and chain. Valve finish shall be [polished brass] [rough chrome plated] [polished chrome plated].

2.6 ALARM CHECK VALVE ASSEMBLY

Assembly shall include an alarm check valve, standard trim piping, pressure gauges, bypass, retarding chamber, testing valves, main drain, and other components as required for a fully operational system.

2.7 WATERFLOW ALARM

[Electrically operated, exterior-mounted, waterflow alarm bell shall be provided and installed in accordance with NFPA 13. Waterflow alarm bell shall be rated 24 VDC and shall be connected to the Fire Alarm Control Panel(FACP) in accordance with Section [13850A FIRE DETECTION AND ALARM SYSTEM, DIRECT CURRENT LOOP] [13851A FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE]] [Mechanically operated, exterior-mounted, water motor alarm assembly shall be provided and installed in accordance with NFPA 13. Water motor alarm assembly shall include a body housing, impeller or pelton wheel, drive shaft, striker assembly, gong, wall plate and related components necessary for complete operation. Minimum 20 mm galvanized piping shall be provided between the housing and the alarm check valve. Drain piping from the body housing shall be minimum 25 mm galvanized and shall be arranged to drain to the outside of the building. Piping shall be galvanized both on the inside and outside surfaces.]

2.8 ALARM INITIATING AND SUPERVISORY DEVICES

2.8.1 Sprinkler Waterflow Indicator Switch, Vane Type

Switch shall be vane type with a pipe saddle and cast aluminum housing. The electro-mechanical device shall include a flexible, low-density polyethylene paddle conforming to the inside diameter of the fire protection pipe. The device shall sense water movements and be capable of detecting a sustained flow of 38 L/min or greater. The device shall contain a retard device adjustable from 0 to 90 seconds to reduce the possibility of false alarms caused by transient flow surges. The switch shall be tamper resistant and contain two SPDT (Form C) contacts arranged to transfer upon removal of the housing cover, and shall be equipped with a silicone rubber gasket to assure positive water seal and a dustproof cover and gasket to seal the mechanism from dirt and moisture.

2.8.2 Sprinkler Pressure (Waterflow) Alarm Switch

Pressure switch shall include a metal housing with a neoprene diaphragm, SPDT snap action switches and a 15 mm NPT male pipe thread. The switch shall have a maximum service pressure rating of 1207 kPa . There shall be two SPDT (Form C) contacts factory adjusted to operate at 28 to 55 kPa . The switch shall be capable of being mounted in any position in the alarm line trim piping of the alarm check valve.

2.8.3 Valve Supervisory (Tamper) Switch

Switch shall be suitable for mounting to the type of control valve to be supervised open. The switch shall be tamper resistant and contain one set of SPDT (Form C) contacts arranged to transfer upon removal of the housing cover or closure of the valve of more than two rotations of the valve stem.

2.9 FIRE DEPARTMENT CONNECTION

Fire department connection shall be [projecting] [flush] type with cast brass body, matching wall escutcheon lettered "Auto Spkr" with a [polished brass] [chromium plated] finish. The connection shall have two inlets with individual self-closing clappers, caps with drip drains and chains. Female inlets shall have 65 mm diameter American National Fire Hose Connection Screw Threads (NH) per [NFPA 1963] [_____].

2.10 SPRINKLERS

Sprinklers with internal O-rings shall not be used. Sprinklers shall be used in accordance with their listed spacing limitations. Temperature classification shall be [ordinary] [intermediate] [_____] [as indicated]. Sprinklers in high heat areas including attic spaces or in close proximity to unit heaters shall have temperature classification in accordance with NFPA 13. Orifice of extended coverage sprinklers shall not exceed 13.5 mm .

2.10.1 Concealed Sprinkler

Concealed sprinkler shall be [chrome-plated] [stainless steel] [white polyester] [quick-response type] [_____] and shall have a nominal 12.7 mm or 13.5 mm orifice.

2.10.2 Recessed Sprinkler

Upright sprinkler shall be [chrome-plated] [stainless steel] [white polyester] [quick-response type] [_____] and shall have a nominal 12.7 mm or 13.5 mm orifice.

2.10.3 Flush Sprinkler

Flush sprinkler shall be [chrome-plated] [stainless steel] [white polyester] [quick-response type] [_____] and shall have a nominal 12.7 mm or 13.5 mm orifice.

2.10.4 Pendent Sprinkler

Pendent sprinkler shall be of the fusible strut or glass bulb type, [recessed] [quick-response] type with nominal 12.7 mm [or 13.5 mm] orifice. Pendent sprinklers shall have a [polished chrome] [stainless steel] [white polyester] [____] finish.

2.10.5 Upright Sprinkler

Upright sprinkler shall be [brass] [chrome-plated] [stainless steel] [white polyester] [quick-response type] [_____] and shall have a nominal 12.7 mm or 13.5 mm orifice.

2.10.6 Sidewall Sprinkler

Sidewall sprinkler shall have a nominal 12.7 mm orifice. Sidewall

sprinkler shall have a [brass] [polished chrome] [stainless steel] [white polyester] [____] finish. Sidewall sprinkler shall be the quick-response type.

2.10.7 Residential Sprinkler

Residential sprinkler shall be the [pendent] [and] [sidewall] type with nominal 12.7 mm orifice. Residential sprinkler shall have a [polished chrome] [white polyester] [_____] finish.

2.10.8 Intermediate Level Rack Sprinkler

Intermediate level rack sprinkler shall be of the upright or pendent type with nominal 12.7 mm orifice and minimum "K" factor of 5.5. The sprinkler shall be equipped with a deflector plate to shield the fusible element from water discharged above it.

2.10.9 Corrosion Resistant Sprinkler

Corrosion resistant sprinkler shall be the [upright] [pendent] type installed in locations as indicated. Corrosion resistant coatings shall be factory-applied by the sprinkler manufacturer.

2.10.10 Dry Sprinkler Assembly

Dry sprinkler assembly shall be of the [pendent,] [upright,] [sidewall,] [45-degree] type as indicated. Assembly shall include an integral escutcheon. Maximum length shall not exceed maximum indicated in UL Fire Prot Dir. Sprinklers shall have a [polished chrome] [polyester coating] [or] [white enamel] finish.

2.11 DISINFECTING MATERIALS

2.11.1 Liquid Chlorine

Liquid chlorine shall conform to AWWA B301.

2.11.2 Hypochlorites

Calcium hypochlorite and sodium hypochlorite shall conform to AWWA B300.

2.12 ACCESSORIES

2.12.1 Sprinkler Cabinet

Spare sprinklers shall be provided in accordance with NFPA 13 and shall be packed in a suitable metal or plastic cabinet. Spare sprinklers shall be representative of, and in proportion to, the number of each type and temperature rating of the sprinklers installed. At least one wrench of each type required shall be provided.

2.12.2 Pendent Sprinkler Escutcheon

Escutcheon shall be one-piece metallic type with a depth of less than 20 mm and suitable for installation on pendent sprinklers. The escutcheon shall have a factory finish that matches the pendent sprinkler heads.

2.12.3 Pipe Escutcheon

Escutcheon shall be polished chromium-plated zinc alloy, or polished chromium-plated copper alloy. Escutcheons shall be either one-piece or split-pattern, held in place by internal spring tension or set screw.

2.12.4 Sprinkler Guard

Guard shall be a steel wire cage designed to encase the sprinkler and protect it from mechanical damage. Guards shall be provided on sprinklers located [____] [as indicated].

2.12.5 Identification Sign

Valve identification sign shall be minimum 150 mm wide x 50 mm high with enamel baked finish on minimum 1.214 mm steel or 0.6 mm aluminum with red letters on a white background or white letters on red background. Wording of sign shall include, but not be limited to "main drain," "auxiliary drain," "inspector's test," "alarm test," "alarm line," and similar wording as required to identify operational components.

2.13 FIRE HOSE REEL ASSEMBLY

Assembly shall include nozzle, fire hose, reel, 40 mm valve, and bracket suitable for wall mounting. The assembly shall be semi-automatic type complete with Underwriters clip which permits controlled one-man operation whereby control valve can be opened, hose unreeled and clip released by pulling on hose. Valve shall be non-rising stem, all bronze, angle type with 40 mm American National Standard Fire Hose Screw Thread (NH) male outlet in accordance with NFPA 1963. Reel shall be of steel construction with red enamel finish and shall be equipped with 30 meters of 40 mm rubber lined fire hose. Nozzle shall be of the industrial combination fog-straight stream type with shutoff. Components of the assembly shall be listed in UL Fire Prot Dir.

2.14 DOUBLE-CHECK VALVE BACKFLOW PREVENTION ASSEMBLY

Double-check backflow prevention assembly shall comply with ASSE 1015. The assembly shall have a bronze, cast-iron or stainless steel body with flanged ends. The assembly shall include pressure gauge test ports and OS&Y shutoff valves on the inlet and outlet, 2-positive-seating check valve for continuous pressure application, and four test cocks. Assemblies shall be rated for working pressure of [1034] [1207] [_____] kPa The maximum pressure loss shall be 40 kPa at a flow rate equal to the sprinkler water demand, at the location of the assembly. A test port for a pressure gauge shall be provided both upstream and downstream of the double check backflow prevention assembly valves.

PART 3 EXECUTION

3.1 FIRE PROTECTION RELATED SUBMITTALS

The Fire Protection Specialist shall prepare a list of the submittals from the Contract Submittal Register that relate to the successful installation of the sprinkler systems(s). The submittals identified on this list shall be accompanied by a letter of approval signed and dated by the Fire Protection Specialist when submitted to the Government.

3.2 INSTALLATION REQUIREMENTS

The installation shall be in accordance with the applicable provisions of

NFPA 13, NFPA 24 and publications referenced therein. Installation of in-rack sprinklers shall comply with applicable provisions of NFPA 230.

3.3 INSPECTION BY FIRE PROTECTION SPECIALIST

The Fire Protection Specialist shall inspect the sprinkler system periodically during the installation to assure that the sprinkler system is being provided and installed in accordance with the contract requirements. The Fire Protection Specialist shall witness the preliminary and final tests, and shall sign the test results. The Fire Protection Specialist, after completion of the system inspections and a successful final test, shall certify in writing that the system has been installed in accordance with the contract requirements. Any discrepancy shall be brought to the attention of the Contracting Officer in writing, no later than three working days after the discrepancy is discovered.

3.4 ABOVEGROUND PIPING INSTALLATION

3.4.1 Protection of Piping Against Earthquake Damage

The system piping shall be protected against damage from earthquakes. Seismic protection shall include flexible and rigid couplings, sway bracing, seismic separation assemblies where piping crosses building seismic separation joints, and other features as required by NFPA 13 for protection of piping against damage from earthquakes.

3.4.2 Piping in Exposed Areas

Exposed piping shall be installed so as not to diminish exit access widths, corridors or equipment access. Exposed horizontal piping, including drain piping, shall be installed to provide maximum headroom.

3.4.3 Piping in Finished Areas

In areas with suspended or dropped ceilings and in areas with concealed spaces above the ceiling, piping shall be concealed above ceilings. Piping shall be inspected, tested and approved before being concealed. Risers and similar vertical runs of piping in finished areas shall be concealed.

3.4.4 Pendent Sprinklers

Drop nipples to pendent sprinklers shall consist of minimum 25 mm pipe with a reducing coupling into which the sprinkler shall be threaded. Hangers shall be provided on arm-overs to drop nipples supplying pendent sprinklers when the arm-over exceeds 300 mm . Where sprinklers are installed below suspended or dropped ceilings, drop nipples shall be cut such that sprinkler ceiling plates or escutcheons are of a uniform depth throughout the finished space. The outlet of the reducing coupling shall not extend more than 25 mm below the underside of the ceiling. On pendent sprinklers installed below suspended or dropped ceilings, the distance from the sprinkler deflector to the underside of the ceiling shall not exceed 100 mm . Recessed pendent sprinklers shall be installed such that the distance from the sprinkler deflector to the underside of the ceiling shall not exceed the manufacturer's listed range and shall be of uniform depth throughout the finished area.

3.4.4.1 Pendent Sprinkler Locations

Pendent sprinklers in suspended ceilings shall be a minimum of 150 mm from

ceiling grid.

3.4.5 Upright Sprinklers

Riser nipples or "sprigs" to upright sprinklers shall contain no fittings between the branch line tee and the reducing coupling at the sprinkler. Riser nipples exceeding 750 mm in length shall be individually supported.

3.4.6 Pipe Joints

Pipe joints shall conform to NFPA 13, except as modified herein. Not more than four threads shall show after joint is made up. Welded joints will be permitted, only if welding operations are performed as required by NFPA 13 at the Contractor's fabrication shop, not at the project construction site. Flanged joints shall be provided where indicated or required by NFPA 13. Grooved pipe and fittings shall be prepared in accordance with the manufacturer's latest published specification according to pipe material, wall thickness and size. Grooved couplings, fittings and grooving tools shall be products of the same manufacturer. For copper tubing, pipe and groove dimensions shall comply with the tolerances specified by the coupling manufacturer. The diameter of grooves made in the field shall be measured using a "go/no-go" gauge, vernier or dial caliper, narrow-land micrometer, or other method specifically approved by the coupling manufacturer for the intended application. Groove width and dimension of groove from end of pipe shall be measured and recorded for each change in grooving tool setup to verify compliance with coupling manufacturer's tolerances. Grooved joints shall not be used in concealed locations, such as behind solid walls or ceilings, unless an access panel is shown on the drawings for servicing or adjusting the joint.

3.4.7 Reducers

Reductions in pipe sizes shall be made with one-piece tapered reducing fittings. The use of grooved-end or rubber-gasketed reducing couplings will not be permitted. When standard fittings of the required size are not manufactured, single bushings of the face type will be permitted. Where used, face bushings shall be installed with the outer face flush with the face of the fitting opening being reduced. Bushings shall not be used in elbow fittings, in more than one outlet of a tee, in more than two outlets of a cross, or where the reduction in size is less than 15 mm (.

3.4.8 Pipe Penetrations

Cutting structural members for passage of pipes or for pipe-hanger fastenings will not be permitted. Pipes that must penetrate concrete or masonry walls or concrete floors shall be core-drilled and provided with pipe sleeves. Each sleeve shall be Schedule 40 galvanized steel, ductile iron or cast iron pipe and shall extend through its respective wall or floor and be cut flush with each wall surface. Sleeves shall provide required clearance between the pipe and the sleeve per NFPA 13. The space between the sleeve and the pipe shall be firmly packed with mineral wool insulation. Where pipes penetrate fire walls, fire partitions, or floors, pipes shall be fire stopped in accordance with Section 07840A FIRESTOPPING. In penetrations that are not fire-rated or not a floor penetration, the space between the sleeve and the pipe shall be sealed at both ends with plastic waterproof cement that will dry to a firm but pliable mass or with a mechanically adjustable segmented elastomer seal.

3.4.9 Escutcheons

Escutcheons shall be provided for pipe penetration of ceilings and walls. Escutcheons shall be securely fastened to the pipe at surfaces through

which piping passes.

3.4.10 Inspector's Test Connection

Unless otherwise indicated, test connection shall consist of 25 mm pipe connected [to the remote branch line] [at the riser as a combination test and drain valve]; a test valve located approximately 2 meters above the floor; a smooth bore brass outlet equivalent to the smallest orifice sprinkler used in the system; and a painted metal identification sign affixed to the valve with the words "Inspector's Test." The discharge orifice shall be located outside the building wall directed so as not to cause damage to adjacent construction or landscaping during full flow discharge.

3.4.11 Drains

Main drain piping shall be provided to discharge [at a safe point outside the building] [at the location indicated]. Auxiliary drains shall be provided as indicated and as required by NFPA 13. When the capacity of trapped sections of pipe is less than 11 liters, the auxiliary drain shall consist of a valve not smaller than 15 mm and a plug or nipple and cap. When the capacity of trapped sections of piping is more than 11 liters, the auxiliary drain shall consist of two 25 mm valves and one 50 x 300 mm condensate nipple or equivalent, located in an accessible location. Tie-in drains shall be provided for multiple adjacent trapped branch pipes and shall be a minimum of 25 mm in diameter. Tie-in drain lines shall be pitched a minimum of 15 mm per 3 mm .

3.4.12 Installation of Fire Department Connection

Connection shall be mounted [on the exterior wall approximately 900 mm above finished grade] [adjacent to and on the sprinkler system side of the backflow preventer]. The piping between the connection and the check valve shall be provided with an automatic drip in accordance with NFPA 13 and arranged to drain to the outside.

3.4.13 Identification Signs

Signs shall be affixed to each control valve, inspector test valve, main drain, auxiliary drain, test valve, and similar valves as appropriate or as required by NFPA 13. Hydraulic design data nameplates shall be permanently affixed to each sprinkler riser as specified in NFPA 13.

3.5 UNDERGROUND PIPING INSTALLATION

The fire protection water main shall be laid, and joints anchored, in accordance with NFPA 24. Minimum depth of cover shall be [900] [_____] mm . The supply line shall terminate inside the building with a flanged piece, the bottom of which shall be set not less than 150 mm above the finished floor. A blind flange shall be installed temporarily on top of the flanged piece to prevent the entrance of foreign matter into the supply line. A concrete thrust block shall be provided at the elbow where the pipe turns up toward the floor. In addition, joints shall be anchored in accordance with NFPA 24 using pipe clamps and steel rods from the elbow to the flange above the floor and from the elbow to a pipe clamp in the horizontal run of pipe. Buried steel components shall be provided with a corrosion protective coating in accordance with AWWA C203. Piping more than 1500 mm outside the building walls shall meet the requirements of Section 02510A WATER DISTRIBUTION SYSTEM.

3.6 EARTHWORK

Earthwork shall be performed in accordance with applicable provisions of Section 02315A $_{\rm EXCAVATION}$, FILLING AND BACKFILLING FOR BUILDINGS.

3.7 ELECTRICAL WORK

Except as modified herein, electric equipment and wiring shall be in accordance with Section 16415A ELECTRICAL WORK, INTERIOR. [Alarm signal wiring connected to the building fire alarm control system shall be in accordance with [Section 13850A FIRE DETECTION AND ALARM SYSTEM, DIRECT CURRENT LOOP] [and] [Section 13851A FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE.]] [All wiring for supervisory and alarm circuits shall be [#14] [#16] AWG solid copper installed in metallic tubing or conduit.] Wiring color code shall remain uniform throughout the system.

3.8 DISINFECTION

After all system components are installed and hydrostatic test(s) are successfully completed, each portion of the sprinkler system to be disinfected shall be thoroughly flushed with potable water until all entrained dirt and other foreign materials have been removed before introducing chlorinating material. Flushing shall be conducted by removing the flushing fitting of the cross mains and of the grid branch lines, and then back-flushing through the sprinkler main drains. The chlorinating material shall be hypochlorites or liquid chlorine. Water chlorination procedure shall be in accordance with AWWA M20. The chlorinating material shall be fed into the sprinkler piping at a constant rate of 50 parts per million (ppm). A properly adjusted hypochlorite solution injected into the system with a hypochlorinator, or liquid chlorine injected into the system through a solution-fed chlorinator and booster pump shall be used. Chlorination application shall continue until the entire system if filled. The water shall remain in the system for a minimum of 24 hours. Each valve in the system shall be opened and closed several times to ensure its proper disinfection. Following the 24-hour period, no less than 25 ppm chlorine residual shall remain in the system. The system shall then be flushed with clean water until the residual chlorine is reduced to less than one part per million. Samples of water in disinfected containers for bacterial examination will be taken from several system locations which are approved by the Contracting Officer. Samples shall be tested for total coliform organisms (coliform bacteria, fecal coliform, streptococcal, and other bacteria) in accordance with AWWA EWW. The testing method shall be either the multiple-tube fermentation technique or the membrane-filter technique. The disinfection shall be repeated until tests indicate the absence of coliform organisms (zero mean coliform density per 100 milliliters) in the samples for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained. After successful completion, verify installation of all sprinklers and plugs and pressure test the system.

3.9 PIPE COLOR CODE MARKING

Color code marking of piping shall be as specified in Section 09900 PAINTING, GENERAL.

3.10 PRELIMINARY TESTS

The system, including the underground water mains, and the aboveground piping and system components, shall be tested to assure that equipment and components function as intended. The underground and aboveground interior piping systems and attached appurtenances subjected to system working pressure shall be tested in accordance with NFPA 13 and NFPA 24. Upon completion of specified tests, the Contractor shall complete certificates as specified in paragraph SUBMITTALS.

3.10.1 Underground Piping

3.10.1.1 Flushing

Underground piping shall be flushed in accordance with NFPA 24. This includes the requirement to flush the lead-in connection to the fire protection system at a flow rate not less that the calculated maximum water demand rate of the system.

3.10.1.2 Hydrostatic Testing

New underground piping shall be hydrostatically tested in accordance with NFPA 24. The allowable leakage shall be measured at the specified test pressure by pumping from a calibrated container. The amount of leakage at the joints shall not exceed 1.89 liters per hour per 100 gaskets or joints, regardless of pipe diameter.

3.10.2 Aboveground Piping

3.10.2.1 Hydrostatic Testing

Aboveground piping shall be hydrostatically tested in accordance with NFPA 13 at not less than $1400~\mathrm{kPa}$ or $350~\mathrm{kPa}$ in excess of maximum system operating pressure and shall maintain that pressure without loss for 2 hours. There shall be no drop in gauge pressure or visible leakage when the system is subjected to the hydrostatic test. The test pressure shall be read from a gauge located at the low elevation point of the system or portion being tested.

3.10.2.2 Backflow Prevention Assembly Forward Flow Test

Each backflow prevention assembly shall be tested at system flow demand, including all applicable hose streams, as specified in NFPA 13. The Contractor shall provide all equipment and instruments necessary to conduct a complete forward flow test, including65 mm diameter hoses, playpipe nozzles, calibrated pressure gauges, and pitot tube gauge. The Contractor shall provide all necessary supports to safely secure hoses and nozzles during the test. At the system demand flow, the pressure readings and pressure drop (friction) across the assembly shall be recorded. A metal placard shall be provided on the backflow prevention assembly that lists the pressure readings both upstream and downstream of the assembly, total pressure drop, and the system test flow rate. The pressure drop shall be compared to the manufacturer's data.

3.10.3 Testing of Alarm Devices

Each alarm switch shall be tested by flowing water through the inspector's test connection. Each water-operated alarm devices shall be tested to verify proper operation.

3.10.4 Main Drain Flow Test

Following flushing of the underground piping, a main drain test shall be made to verify the adequacy of the water supply. Static and residual pressures shall be recorded on the certificate specified in paragraph SUBMITTALS. In addition, a main drain test shall be conducted each time after a main control valve is shut and opened.

3.11 FINAL ACCEPTANCE TEST

Final Acceptance Test shall begin only when the Preliminary Test Report has been approved. The Fire Protection Specialist shall conduct the Final Acceptance Test and shall provide a complete demonstration of the operation of the system. This shall include operation of control valves and flowing of inspector's test connections to verify operation of associated waterflow alarm switches. After operation of control valves has been completed, the main drain test shall be repeated to assure that control valves are in the open position. In addition, the representative shall have available copies of as-built drawings and certificates of tests previously conducted. The installation shall not be considered accepted until identified discrepancies have been corrected and test documentation is properly completed and received.

3.12 ON-SITE TRAINING

The Fire Protection Specialist shall conduct a training course for operating and maintenance personnel as designated by the Contracting Officer. Training shall be provided for a period of [____] hours of normal working time and shall start after the system is functionally complete but prior to the Preliminary Tests and Final Acceptance Test. The On-Site Training shall cover all of the items contained in the approved Operating and Maintenance Instructions.

-- End of Section --

SECTION 13965A

WET CHEMICAL FIRE EXTINGUISHING SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

FACTORY MUTUAL ENGINEERING AND RESEARCH (FM)

FM P7825a (1998) Approval Guide Fire Protection

FM P7825b (1998) Approval Guide Electrical Equipment

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 17A (1998) Wet Chemical Extinguishing Systems

NFPA 96 (1998) Ventilation Control and Fire Protection of Commercial Cooking

Equipment

UNDERWRITERS LABORATORIES (UL)

UL Fire Prot Dir (1999) Fire Protection Equipment Directory

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Wet Chemical Fire Extinguishing System; G, [____]

Drawings consisting of system layout including assembly and installation details and electrical connection diagrams; piping layout showing pipe sizes, lengths, and supports. Drawings shall include any information required to demonstrate that the system has been coordinated and will function as intended and shall show system relationship to items it protects and clearances required for operation and maintenance. Drawings shall also include conduit, cables, manual actuation stations and fusible links.

SD-03 Product Data

Similar Services;	[],	[]]
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Statement demonstrating successful completion of similar services on at least five projects of similar size and scope, at least 2 weeks before submittal of other items required by this section.

Wet Chemical Fire Extinguishing System; G, []
Manufacturer's catalog data including detail drawings for the following items. The data shall be highlighted to show model, size, options, etc., that are intended for consideration and shall be adequate to demonstrate compliance with contract requirements.
a. Storage containers and mounting brackets
b. Fusible links, cables, conduit, corner pulleys, and link mounting frames/brackets
c. Release mechanisms
d. Valves
e. Discharge nozzles
f. Piping components
g. Remote manual actuation stations
h. Fuel and power shutoff
i. Alarms, alarm devices, alarm interface(s), control panels
Preliminary Tests; G, []
Proposed test procedures for preliminary test, at least 2 weeks before the start of related testing.
Final Acceptance Tests; G, []
Proposed test procedures for final acceptance test, at least 2 weeks before the start of related testing.
System Diagrams; G, []
Proposed diagrams, at least 2 weeks before the start of preliminary tests. System diagrams that show system layout and typed condensed normal and emergency operating procedures, methods for checking the system for normal, safe operation, and procedures for manual actuation shall be framed under glass or laminated plastic. After approval, these items shall be posted where directed.
Test Schedule; []
Proposed test schedule for acceptance test, at least 2 weeks before the start of related testing.
Field Training; [], []
Proposed schedule for field training, at least 2 weeks before the start of related training.
-06 Test Reports

Preliminary Tests; [], []	
Test report for the preliminary tests in booklet form, upon completion of testing. Report shall document test results including repairs and adjustments made, and final test results.	
Final Acceptance Tests; [], []	
Test report for the final acceptance tests in booklet form, u completion of testing. Report shall document test results including repairs and adjustments made, and final test results. The weight of each storage container shall be recorded before final acceptance test and after test has been completed and containers recharged.	pon
SD-07 Certificates	
Installation Technician; G, []	
Concurrent with statement of similar services, manufacturer's certification of installation technician.	
Installation Drawings; G, []	
Concurrent with installation drawings, manufacturer's certification of installation drawings.	
SD-10 Operation and Maintenance Data	
Wet Chemical Fire Extinguishing System; [], []	
[Six] [] manuals listing step-by-step procedures require for system actuation (automatic and manual), recharging, and routine maintenance, at least 2 weeks before field training. T manuals shall include the manufacturer's name, model number, pa list, list of tools and parts that should be kept in stock by t owner for routine maintenance including the name of a local supplier, simplified wiring and control diagrams, troubleshooti guide, and recommended service organization (including address telephone number). Service organization shall be capable of providing [4] [] hour onsite response to a service call on emergency basis.	he rts he ng and
1.3 GENERAL REQUIREMENTS	
1.3.1 System Description	
Each of the following cooking equipment items [], including the exhaust hood, [grease extractor,] [grease filter,] and exhaust duct serving the item shall be protected by preengineered wet chemical fire extinguishing system. System shall be installed with all accessories necessary for system to operate in accordance with manufacturer's instructions and as specified herein.	/ing

1.3.2 Regulatory Requirements

System application, design, and installation shall comply with NFPA 17A and NFPA 96, except as follows:

- a. Compliance shall include conformance to the advisory provisions by changing "should" to "shall."
- b. System components shall be listed in UL Fire Prot Dir or approved by FM P7825a and FM P7825b for use with wet chemical fire extinguishing systems.
- c. Reference to the "authority having jurisdiction" shall be interpreted to mean the Contracting Officer.
- d. The use of grease extractors does not eliminate the requirement that duct systems, grease removal devices, and hoods be protected by the wet chemical extinguishing system.

1.3.3 Installation Drawings

Installation drawings shall be prepared by a representative of the manufacturer to ensure compliance with the requirements listed herein and with all manufacturer's requirements and recommendations.

1.3.4 Installation Technician

The installation technician shall have been trained by the system manufacturer for system installation, operation, and maintenance.

1.4 COORDINATION OF TRADES

Each system shall be coordinated with the equipment, hood, and exhaust ducts that it protects along with other construction in order to eliminate any interference.

1.5 DELIVERY AND STORAGE

Equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

System components shall be the standard products of a manufacturer regularly engaged in the manufacturing of products that are of similar material, design and workmanship. The standard products shall have been in satisfactory commercial or industrial use for 2 years before bid opening. The 2-year experience shall include installations of systems under similar circumstances and of similar size. Systems shall be supported by a service organization.

2.2 PIPING COMPONENTS

2.2.1 Pipe and Fittings

Pipe and fittings shall be Schedule 40 stainless steel. Stainless steel tubing may be used in accordance with manufacturer's recommendations. Galvanized pipe shall not be used.

2.2.2 Nozzles

Nozzles shall be stainless steel and shall be equipped with an integral strainer to prevent matter inside the distribution piping from clogging the nozzle orifice. Each nozzle orifice shall be provided with a seal to protect the nozzle from clogging by grease or other obstructions. This seal shall detach upon actuation.

2.3 SYSTEM CONTROLS

Each system shall be actuated by fusible link and by a remote manual actuation station connected to the extinguishing system release mechanism by cable. Remote manual actuation stations shall be located along the path of egress and shall automatically actuate the [building] [base] fire alarm system. The system controls shall automatically shut off fuel flow and electrical power to the protected appliances and other appliances located under the ventilating system protected by the extinguishing system upon system actuation. All cables used shall be stainless steel with corner pulleys employing stainless steel ball bearings at all corners. All cable and wiring shall be enclosed in conduit.

2.4 EXISTING BUILDING FIRE ALARM CONTROL PANEL

The existing building fire alarm control panel was manufactured by [____], Model [____], and presently has [____] spare zone modules. The wet chemical fire extinguishing system shall be connected to [the zone currently serving [____]] [a spare zone module]. The fire alarm panel zone identification label shall be replaced with a new label of similar construction which indicates the equipment connected to the zone module. Discharge of the extinguishing system shall actuate the fire alarm control panel in the same manner as other actuating devices. Extinguishing system wiring shall be supervised in the same manner as other devices connected to the fire alarm system.

2.5 WET CHEMICAL

The wet chemical shall not have an adverse effect on stainless steel during exposure periods of up to $24\ \mathrm{hours}$.

2.6 IDENTIFICATION SIGNS

Identification signs shall be located at each remote manual actuation station. Signs shall be fabricated of rigid plastic, red in color, with engraved white letters that are a minimum 6.5 mm inches in height. Each sign shall be engraved with "Fire Extinguishing System" and with a brief description of the equipment protected.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be performed by the installation technician in accordance with system manufacturer's instructions. Ductwork access doors shall be provided where indicated and at any items requiring service and inspection, including nozzles and fusible links. Ductwork access doors shall be in accordance with Section 15895A AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

3.2 PRELIMINARY TESTS

After installation has been completed, each system shall be actuated by

both fusible link and by remote actuation station to demonstrate proper function of all components, including alarms and fuel flow and power shut off. Actuation by fusible link shall be in a manner approved by the system manufacturer. Test containers, pressurized with either nitrogen or air to normal system operating pressure and of the same size as actual operating containers shall be discharged into system. The seals shall release as during normal actuation. After each discharge, the nozzles shall be removed, disassembled, and strainers shall be cleaned. System piping shall be inspected and cleaned as necessary. All functions of system operation shall be verified, including switches, shutdown of fuel and power to appliances protected by the system or served by the same ventilation system, uniform delivery of air or nitrogen, and activation of alarms. Nozzle seals/covers shall be replaced after the preliminary tests are complete. In the event portions of the tests are unsuccessful, repairs shall be made and the entire test repeated until successful.

3.3 FINAL ACCEPTANCE TESTS

System shall be actuated by both fusible link and remote manual actuation station and all system functions shall be verified as described in Paragraph PRELIMINARY TESTS [using test containers specified for preliminary tests] [except that actual system containers fully charged with wet chemical shall be used]. Each nozzle shall be provided with a plastic container, hose, and hose fitting to capture all wet chemical discharged. All tests or checks recommended by the manufacturer shall also be performed. In the event portions of the tests are unsuccessful, repairs shall be made and the entire test repeated until successful. Nozzle seals/covers shall be replaced after the final acceptance tests are complete. The system shall be returned to normal operating condition after the completion of testing and wet chemical containers expended shall be recharged and verified leak tight. Extinguishing system and equipment and duct protected by the extinguishing shall be cleaned after completion of testing. Any damage shall be repaired by the Contractor. The weight of each storage container shall be recorded before final acceptance test and after test has been completed and containers recharged.

3.4 FIELD TRAINING

The Contractor shall conduct a training course for operating and maintenance personnel as designated by the Contracting Officer. Training shall be provided for a period of [____] hours of normal working time and shall start after the system is functionally complete but prior to the final acceptance test. The field instruction shall cover all of the items contained in the approved Operation and Maintenance Instructions.

-- End of Section --

DIVISION 14 - CONVEYING SYSTEMS (Not Applicable)

DIVISION 15 - MECHANICAL

15000: Outline Specifications

Government-Edited Guide Specifications:

15971 Direct Digital HVAC Control Systems

SECTION 15000

DIVISION 15: MECHANICAL - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Contractor Edited Guide Specifications

Government provided UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFSG) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility.

The contractor shall edit and provide the following UFGS guide specifications for Division 15: Mechanical:

SECTION 15070A, SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT

SECTION 15080A, THERMAL INSULATION FOR MECHANICAL SYSTEMS

SECTION 15182A, REFRIGERANT PIPING

SECTION 15190A, GAS PIPING SYSTEMS

SECTION 15400A, PLUMBING, GENERAL PURPOSE

SECTION 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH

SECTION 15620A, LIQUID CHILLERS

SECTION 15700A, UNITARY HEATING AND COOLING EQUIPMENT

SECTION 15895A, AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM

SECTION 15990A, TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS

SECTION 15995A, COMMISSIONING OF HVAC SYSTEMS

1.1.1.1 References

All references that have been deleted from the body of the guide specification shall be delete from the general paragraph which defines the reference.

1.1.1.2 Standard Products

Material and equipment shall be a standard product of a manufacturer

regularly engaged in the manufacture of the product and shall be essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted.

1.1.1.3 Electrical Work

Electrical motor-driven equipment specified herein shall be provided complete with motors. Motors shall conform to the requirements of Section 16415 ELECTRICAL WORK, INTERIOR. Motor starters and disconnect switches shall be provided and installed for all motors under Section 16415A, ELECTRICAL WORK, INTERIOR. When available, starters and disconnect switches may be provided integral with the equipment from the factory. All equipment electrical data of voltage, phase and power requirements shall be fully coordinated with the plans and specifications.

1.1.1.4 Submittals

All submittals listed in the guide specifications shall be submitted to the designer for approval. All items to be submitted, including product literature, calculations, component data, certificates, diagrams and drawings, shall be submitted concurrently in one complete system submittal. Omission of any required submittal item from the package shall be sufficient cause for disapproval of the entire submittal. Unless otherwise indicated in the submittal review commentary, disapproval of any item within the package shall require a re-submittal of the entire system package, in which all deficiencies shall be corrected. Furthermore, a copy(s) of the reviewed submittal shall be provided to the government for information and/or acceptance.

1.1.1.5 Regulatory Requirements

All regulatory requirements contained out in the guide specification shall be retained in the contractor edited project specification.

1.1.1.6 Guide Specification Requirements

All products, equipment, systems and materials specified in Section 01016, MECHANICAL REQUIREMENTS shall be as specified in the applicable UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFSG) listed above. The specifications shall be edited in accordance with the designer notes associated with each specification. Editing of the specific material and installation requirements shall be limited to these choices called out within the designer's notes except as indicated below.

1.1.1.7 Non-Applicable Mechanical Equipment and Systems

Specific products and items of equipment identified in the provided specifications but not required for the facility shall be edited out. All products, equipment and systems specified UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFSG) listed above but not specified in Section 01016, MECHANICAL REQUIREMENTS shall be deleted from the contractor edited specification section.

1.1.1.8 Additional Requirements

All additional requirements for products, equipment, systems and materials specified in Section 01016, MECHANICAL REQUIREMENTS that exceed or conflict with the applicable UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFSG) listed above shall be as specified in Section 01016, MECHANICAL REQUIREMENTS.

1.1.1.9 Items Without Government Guide Specification

Where products, items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals or testing requirements are not specified in the guide specifications, special Sections within each applicable guide specification shall be prepared to specify those items. All of the additional requirements for the equipment, systems and materials specified in Section 01016, MECHANICAL REQUIREMENTS shall be incorporated into the special Sections within each applicable guide specification shall be prepared to specify those items.

1.1.2 Government Edited Specifications

The contractor shall incorporate the following government-supplied, fully edited specification sections as part of the project design:

SECTION 15971, DIRECT DIGITAL HVAC CONTROL SYSTEM

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 534

(1999) Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form

U.S. ARMY CORPS OF ENGINEERS (USACE)

TI 809-04

(1998) Seismic Design for Buildings

1.3 SECTION 15070A, SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT

The contractor edited specification section shall include seismic protection measures for all mechanical equipment and systems as required by TI 809-04 Seismic Design for Buildings. Structural requirements shall be in accordance with Section 01015 STRUCTURAL REQUIREMENTS and Section 13080A SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT.

1.3.1 Sway Brace Location Plan

A separate sway brace location plan shall not be submitted under this Section. Sway brace locations for ductwork and piping shall be shown on the respective shop or fabrication drawing submittals for ductwork and piping which are required in other DIVISION 15 Sections.

1.3.2 Seismic Sway braces Requirements

Seismic sway braces shall be provided at intervals as required in the guide specification. One brace shall be provided for each interval. Where a duct

or pipe segment is shorter than the required bracing interval, at least one sway brace shall be provided for that segment. Attachments to equipment shall not be considered acceptable pipe sway braces.

1.4 SECTION 15080A, THERMAL INSULATION FOR MECHANICAL SYSTEMS

The contractor edited specification section shall include the following material physical characteristics and performance criteria for field-applied insulation and accessories on mechanical systems shall be as specified herein; factory-applied insulation is specified under the piping, duct or equipment to be insulated. Insulation of chilled water systems outside of buildings shall be as specified in Section 02555A PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM.

1.4.1 Identification of Materials

Add the following to the subject paragraph; Insulation materials shall be delivered in the manufacturer's unopened containers. Materials shall remain in the manufacturer's unopened containers until actual use and shall not be transferred to any other containers.

1.4.2 Delete Acoustical Lining Insulation Adhesive

Acoustical lining and/or acoustical lining insulation adhesive shall not be provided as part of this project. Delete this paragraph from the project specifications.

1.4.3 Pipe Insulation

All pressure piping shall be insulated as specified in the guide specification for the service intented. All exceptions to the requirement for insulation, which may be contained within the guide specification, shall be deleted except for piping passing through a fire rated surface when required for fire stopping purposes.

1.4.4 Insulation Covers

Provide reusable insulation covers at all check valves, control valves, strainers, filters, or any other piping component requiring access for routine maintenance. Insulation exposed to the weather or possible physical damage shall be covered by an aluminum metal jacket. All piping with metal jacket shall be identified on the drawings.

1.4.5 Dual Temperature Piping

There shall be no dual temperature piping within this project. Delete all paragraphes related to dual temperature piping from the project specifications.

1.4.6 Delete Flexible Elastomeric Cellular Insulation

The use of Flexible Elastomeric Cellular Insulation:ASTM C 534, Type I or II on cold water pipes and equipment shall not be promitted. The use of Flexible Elastomeric Cellular Insulation:ASTM C 534, Type I or II in thicknesses greater than 15 mm shall not be promitted.

1.4.7 Delete Contact Adhesive

Contact adhesive is used only with flexible cellular insulation. Since

flexible cellular insulation shall not be used, delete this paragraph.

1.4.8 Supply and Outside Air Ductwork Insulation

All supply and outside air ductwork shall be insulated as specified in the guide specification for the service intented. All exceptions to the requirement for insulation, which may be contained within the guide specification, shall be deleted except for ductwork passing through a fire rated surface when required for fire stopping purposes.

1.4.9 Return and Exhaust Air Ductwork Insulation

All return and exhaust ductwork shall be insulated as specified in the guide specification for the service intented whenever the ductwork eneters a space that is not conditioned to the exact heating and cooling setpoint as the space the duct serves. All exceptions to the requirement for insulation, which may be contained within the guide specification, shall be deleted except for ductwork passing through a fire rated surface when required for fire stopping purposes.

1.4.10 Insulated Ductwork Within the Kitchen

All ductwork contained within the kitchen and adjoining service ares, which requires insulation as specified above, shall be provided with a stainless steel jacket to facilitae the cleaning requirements of the food preporation areas.

1.4.11 Rectangular Duct Exposed to Weather

The top surface of rectangular duct exposed to weather must have a minimum pitch of not less than 1 inch per linear foot. The flat surface shall not be subject to ponding water.

1.5 SECTION 15182A, REFRIGERANT PIPING

This guide specification covers the requirements for refrigerant piping. The contractor shall edited this specification section if split type direct expansion systems are supplied for the communication rooms or kitchen refrigeration equipment. All field installed refrigerant piping shall conform to the material physical characteristics, performance criteria and instalation requirements found in the guide specification.

1.6 SECTION 15190A, GAS PIPING SYSTEMS

This guide specification covers the requirements for low pressure gas systems conforming to NFPA NFPA 5/ANSI Z223.14 for nonindustrial uses.

1.6.1 Material Criteria

Interior piping shall be black steel. The contractor edited specification section shall include the material physical characteristics and performance criteria for Steel Pipe, Joints, and Fittings. Aluminum Alloy Pipe and Tubing, Joints, and Fittings; Copper Tubing, Joints and Fittings; Steel Tubing, Joints and Fittings; Thermoplastic Pipe, Tubing, Joints, and Fittings; and Fiberglass Pipe, Joints, and Fittings shall be deleted from the project specifications.

1.6.2 Piping in Partitions

Concealed piping shall be located in hollow partitions only. Piping shall not be located in solid or cellular masonry walls or solid partitions. Tubing passing through walls or partitions shall be protected against physical damage.

1.6.3 Anodeless Riser

Connections between aboveground metallic and underground plastic piping shall be made only outside, underground, and with approved anodeless riser type transition fitting.

1.6.4 Delete Underground Metallic Pipe

Buried metallic piping shall not be provided. Underground distribution piping shall be shall be polyethylene as specified in $^{\text{Section 02556A}}$ GAS DISTRIBUTION SYSTEM. Delete all references to buried metallic piping from the project gas specifications.

1.6.5 Piping Buried Under Buildings

Underground piping shall not be installed beneath buildings. Delete this paragraph in the guide specification from the project specification.

1.7 SECTION 15400A, PLUMBING, GENERAL PURPOSE

This guide specification covers general purpose type plumbing systems. This specification essentially implements the requirements of the International Plumbing Code (IPC). Equipment supports and connections, for either equipment on the ground or in the building, will conform to these requirements.

1.7.1 Domestic Water Service Meter

Domestic water meter shall be as specified in Section 02510A, WATER DISTRIBUTION SYSTEM or Section 15400A, PLUMBING, GENERAL PURPOSE. Coordinate with the project Civil Engineer.

1.7.1.1 Maximum Water Pressure Drop

The following sentence, which limits the maximum water pressure drop through the meter, shall be added to the project specifications; Maximum pressure drop through the meter shall be [___] kPa at a flowrate of [___] L/s. The values of flowrate and pressure drop within the brackets shall be coordinated with the design of the plumbing system.

1.7.1.2 Meter Boxes

When exterior water meters are provided or specified, the specification for meter boxes shall be added to the project specifications; Meter boxes shall be of cast iron or concrete of sufficient size to completely enclose the meter and shut-off valve or service stop. Box height shall extend from invert of the meter to final grade at the meter location. Cover shall be cast iron with the word "WATER" cast in it.

1.7.2 Piping Material Criteria

The Tables at the end of the specification shall be edited to indicate which materials shall be used for installation of each system. The contractor edited specification section shall include the following

material physical characteristics and performance criteria for piping systems:

1.7.2.1 Domestic Pressure Piping

Materials for domestic hot and cold water distribution systems shall be copper aboveground and copper type k underground. Underground domestic piping shall be limited to building service entrance and exits to exterior drinking fountains. All piping 50 mm and smaller shall be soldered using 95/5 tin antimony solder, piping 65 mm and larger shall be brazed. Multi-flame torch is not required for soldering or brazing. TABLE II shall be edited to indicate which materials shall be used for installation of each system.

1.7.2.2 Wall Hydrants

Coordinate the terminology "wall hydrants" and "freeze-proof wall hydrants" between the drawings and the specifications. All exterior wall hydrants shall be of the freeze-proof type. Show the elevation of wall hydrants on the plans or add the following sentence to this paragraph; Wall hydrants shall be installed 600 mm above finished grade.

1.7.2.3 Wall Faucets

Coordinate the terminology "wall faucets" and "hose bibbs" between the drawings and the specifications. Show the elevation of wall faucets on the plans or add the following sentence to this paragraph; wall faucets shall be installed 600 mm above finished grade.

1.7.2.4 Soil, Waste, Drain, and Vent Piping

Materials for above/below ground soil, waste, and vent shall be as specified in Table I in CEGS Section 15400A PLUMBING, GENERAL. All building underslab piping elevations should be shown on the drawings. Verify that the pipe elevations do not conflict with building structural footings and foundations walls.

1.7.2.5 Pipe Cleanouts

Sanitary plans shall show sufficient cleanouts for system maintenance. Cleanouts shall be provided at all turns and at least every 15 m along straight runs.

1.7.2.6 Identification of Piping

All exposed and concealed piping in accessible spaces shall be identified in accordance with the requirements of UFGS Section 09900A, PAINTING, GENERAL.

1.7.3 Fixtures

Plumbing fixtures, faucets and trim shall be as specificed in the guide specification except as specifically modified in Section 01014, INTERIOR DESIGN.

1.7.4 Escutcheons

Escutcheons are not generally available in satin-finish, corrosion-resisting steel, polished chromium-plated zinc alloy, or polished

chromium-plated copper alloy as specified in Section 15400A, PLUMBING, GENERAL PURPOSE. Escutcheons shall be chromium plated steel escutcheons only.

1.7.5 Structural Interferance

All building underslab piping elevations shall be shown on the drawings. The contractor shall verify that the pipe elevations do not conflict with building structural footings and foundations walls before any building structural footings and foundations walls are formed.

1.7.6 EPDM Roof Requirements

Pipes, which pass through EPDM roof material shall be flashed watertight in accordance with the recommendations and details of the EPDM roof manufacturer.

1.8 SECTION 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH

This guide specification covers the requirements for packaged hot water and steam boiler systems (gas fired) of up to 6000 kW output capacity as required in Section 01016, MECHANICAL REQUIREMENTS. The hot water boiler and piping systems operate at water temperatures below 120 degrees C and water working pressures less than 1100 kPa. This guide specification also covers the requirements for packaged hot water and steam boiler systems (oil or combination oil/gas fired) of up to 6000 kW output capacity. All references to steam and to fuel types other than natural gas shall be deleted from the project specifications.

1.8.1 High and Medium Temperature Water Systems

All heating systems contain in this project have been limited to low temperature water heating or low pressure steam systems. Delete are specifications for high and medium temperature water systems.

1.8.2 Boilers

Delete water tube boilers. Delete cast iron boilers.

1.8.2.1 Condensing Boiler

Condensing boilers shall be in the form of fire tube boilers with pulse combustion. Delete copper fire tube type boilers and multiple heat exchanger type boilers from the project specifications.

1.8.2.2 Hydronic Boiler Modular Configuration

Hydronic boilers shall be of the modular, condensing type.

1.8.2.3 Hot Water Boilers

Hot water boilers shall be specified for space heating. All blanks shall be completed by the designer to comply with Section 01016, MECHANICAL REOUIREMENTS.

1.8.2.4 Steam Boilers

Steam boilers shall be specified for when a steam to steam heat exchanger

is to be provided for the energy source of the dry steam humidifiers. All blanks shall be completed by the designer to comply with Section 01016, MECHANICAL REQUIREMENTS. A water softener shall be provided for all make up water to the steam boiler and humidifiers when steam boilers are provided.

1.8.3 Fuel Burning Equipment

Include all the required data for proper design of the boiler. Delete all references to fuel oils and combination gas and oil fired units which shall not be used.

1.8.3.1 Gas Pulse Combustion Burners and Controls

Burners shall be an integral part of the boiler module heat exhcanger and require no pilot. Burner shall operate on the pulse combustion principle, shall be self-aspirating and require no forced-draft or induced-draft fan to supply air for combustion after ignition. Burner control shall be on/off operative type. Burner shall be provided complete with fuel supply system. Gas fired units shall conform to UL 795. Pulse combustion chamber and fire tubes shall be contructed of stainless steel.

1.8.3.2 Combustion Control Equipment for Package Equipment

Each boiler shall be equipped with a factory wired control panel. Control systems and safety devices for automatically fired boilers shall conform to ASME CSD-1 and shall be UL listed. Electrical combustion and safety controls shall be rated at 120 volts, single phase, 60 Hz and shall be connected as specified in Section 16415 ELECTRICAL WORK, INTERIOR. Indicating lights shall be provided on the control panel. A red light shall indicated flame failure, and a green light shall indicate that the main fuel valve is open. Panel for each boiler shall be integral to the unit. The following shutdown conditions shall require manual reset before the boiler can automatically recycle:

- a. Flame failure.
- b. Blocked combustion air intake.
- c. Insufficient prepurge air.
- d. Low-water cutoff.
- e. High temperature cutoff.

1.8.3.3 Boiler Control DDC Panel for Multiple Boiler Sequencing

The boiler control DDC panel shall be as specified in Section 15971, DIRECT DIGITAL HVAC CONTROL SYSTEMS.

1.8.4 Steam to Steam Heat Exchanger

When a steam-to-steam heat exchanger is selected as the energy source for the dry steam humidifiers, than a specification for the steam-to-steam shall be added in this section. The specification for the steam-to-steam heat exchanger shall be applicable for the steam pressures and temperatures on both sides of the heat exchanger and of a simular quality as specified for other heat exchangers in Section 15556A FORCED HOT WATER HEATING SYSTEMS USING WATER AND STEAM HEAT EXCHANGERS. The unit shall be installed as a complete and functioning system with all accessories as recommended by the steam-to-steam heat exchanger's manufacture.

1.8.5 Continuous Emissions Monitoring

Delete this paragraph for pulse boilers.

1.8.6 Conventional Breeching and Stacks

Delete this paragraph for condensing boilers.

1.8.7 Foundation (Setting) Materials

Delete this paragraph for condensing boilers.

1.8.8 FUEL OIL STORAGE SYSTEM

Delete this paragraph for condensing boilers.

1.8.9 Pipe Expansion

Expansion loops and offsets shall provide adequate expansion of the main straight runs of the system within the stress limits specified in ASME B31.1. The loops and offsets shall be cold-sprung and installed where required. Pipe guides and anchors shall be provided as required. The designer shall show the location loops, offsets, pipe guides and anchors on the project drawings. When pipe expansion cannot be handled through offsets and loops, than justification shall be provided. When pipe expansion can be handled through offsets and loops, than expansion joints shall be deleted from the project specification.

1.8.10 Hot (and Chilled) Water Piping

This specification shall also apply to chilled water piping.

1.8.10.1 Pipe Materials

All new heating water piping within the facility shall be black steel conforming to ASTM A53, Schedule 40 or copper.

1.8.10.2 Pipe Joints

HVAC water piping installed within the facility shall utilize threaded joints or welded joints. Welded joints and fittings shall be used for joints 65 mm and larger. Copper pipe joints 65 mm and larger shall be brazed.

1.8.10.3 Grooved Mechanical Joints

Grooved mechanical pipe joints and fittings shall only be installed in accessable locations.

1.8.10.4 Connections to Equipment

Connections to equipment shall utilize unions for pipe $50\ \mathrm{mm}$ and smaller and flanges for pipe $65\ \mathrm{mm}$ and larger.

1.8.11 Pumps

Delete all pump except as listed below:

1.8.11.1 HVAC Water Circulating Pumps

The HVAC water shall be circulated by base mounted, end-suction, centrifugal pumps with mechanical seals. Required flow rate and head loss shall be corrected for glycol. The pumps shall be non-overloading allowing the pump to operate at any point on its characteristic curve. Each pump shall be provided with a calibrated bronze balancing valve.

1.8.11.2 Condensate Pumping Unit

Steam boilers shall be specified for when a steam to steam heat exchanger is to be provided for the energy source of the dry steam humidifiers. This paragraph shall be modified as required by the designer to specificy the boiler feed units asspecified in Section 01016, MECHANICAL REQUIREMENTS.

1.8.12 Steam Traps

All steam traps shall be of the float-and-thermostatic type. Delete all other types of steam traps from the guide specification.

1.8.13 FUEL OIL SYSTEM

Delete this paragraph for condensing boilers.

1.9 SECTION 15620A, LIQUID CHILLERS

This guide specification covers the requirements for liquid chilling equipment, including air cooled, rotary screw type liquid chiller as required in Section 01016, MECHANICAL REQUIREMENTS.

1.9.1 MANUFACTURER'S MULTI-YEAR COMPRESSOR WARRANTY

Include a 5 year warranty as follows; The Contractor shall provide a 5 year parts and labor (includes refrigerant) manufacturer's warranty on the $\operatorname{air-cooled}$ chiller $\operatorname{compressor}(s)$. This warranty shall be directly from the chiller manufacturer to the Government and shall be in addition to the standard one-year warranty of construction. The manufacturer's warranty shall provide for the repair or replacement of the chiller compressor(s) that become inoperative as a result of defects in material or workmanship within 5 years after the date of final acceptance. When the manufacturer determines that a compressor requires replacement, the manufacturer shall furnish new compressor(s) at no additional cost to the Government. Upon notification that a chiller compressor has failed under the terms of the warranty, the manufacturer shall respond in no more than 24 hours. Response shall mean having a manufacturer-qualified technician onsite to evaluate the extent of the needed repairs. The warranty period shall begin on the same date as final acceptance and shall continue for the full product warranty period.

1.9.2 Chiller Energy Performance Requirements

All chillers supplied shall have a minimum EER or Energy Efficiency Ratio (Btuh/Watt) of 9.5.

1.9.3 Rotary Screw Type Chillers

Chillers shall be of the self contained - package - air cooled - rotary screw type. Delete other chiller options from the specification.

1.9.3.1 SPLIT-SYSTEM LIQUID CHILLER

Delete this chiller type from the specification.

1.9.3.2 Controls

The chiller should be equipped with a factory-piped and wired microprocessor based (DDC) control panel which shall provide all control functions including start-up, shut-down, leaving chilled water temperature control, capacity reduction, fan sequencing, antirecycle logic, automatic lead-lag compressor starting and load limiting.

1.9.3.3 Energy Management Control System (EMCS) Interface

The EMCS interface shall be as specified in Section 15971, DIRECT DIGITAL HVAC CONTROL SYSTEMS.

1.9.3.4 Compressor(s)

Compressors shall be of the rotary screw type. Delete other compressor options from the specification.

1.9.3.5 Compressor Driver, Gas-Engine

Delete this paragraph type from the specification.

1.9.3.6 Compressor Driver, Steam Turbine

Delete this paragraph type from the specification.

1.9.3.7 Air-Cooled Condenser Coil

Condenser shall be of the air cooled type. Delete other condenser options from the specification.

1.9.4 Refrigerant Recovery/Recycle System

Delete this paragraph type from the specification.

1.9.5 Automatic Tube Brush Cleaning System

Delete this paragraph type from the specification.

1.9.6 Chilled Water Piping and Accessories

Chilled water piping and accessories shall be provided and installed in accordance with Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH.

1.9.7 Refrigerant Piping

Delete this paragraph type from the specification.

1.9.8 Cooling Tower

Delete this paragraph type from the specification.

1.9.9 Temperature Controls

Modify this paragraph as required to coordinate the central equipment controls with the air-side system controls. Chiller control packages shall

be fully coordinated with and integrated into the temperature control system specified in Section 15971, DIRECT DIGITAL HVAC CONTROL SYSTEMS.

1.9.10 Mechanical Room Ventilation

Delete this paragraph type from the specification.

1.10 SECTION 15700A, UNITARY HEATING AND COOLING EQUIPMENT

This guide specification includes tailoring options for room unit, package systems, split system, and air-conditioners, heat pumps, and accessories. The use of this type of equipment shall be limited to the communication rooms as required in Section 01016, MECHANICAL REQUIREMENTS.

1.10.1 Blower Speed

When the blower has multible speeds, than the units shall be selected to provide the scheduled coil capacity supply air volume while operating on medium blower speed.

1.10.2 Sound Power Levels

Unit sound power levels, dB referenced to the 10 to the minus twelfth power watt, at the fan operating speed selected to meet specified capacity shall not exceed the following values in each octave band at mid-frequency:

Unit Capacity Octave Band/Mid-frequency 6/2000 7/4000 in CFM 3/250 4/500 5/100

MAXIMUM SOUND POWER LEVELS dB

1.10.3 Heating Source

Electric heat shall not be provided.

1.11 SECTION 15895A, AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM

This guide specification covers the requirements for air supply, distribution, ventilation, air systems equipment, air handling units and exhaust portion of an HVAC system as required in Section 01016, MECHANICAL REQUIREMENTS.

1.11.1 Standard Products

Add the following requirements to this paragraphin the project specification: "All products used in the air supply and distribution system shall be appropriate for the intended purpose and suitable for the pressures and temperatures encountered."

1.11.2 PIPING COMPONENTS

The material and installation specifications for piping components shall be deleted from this specification. Add the following sentence in place of both the material and installation specifications for piping components; Piping and piping components for both the hot and chilled water systems shall be as specified for hot water systems in Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH.

1.11.3 CONTROLS

Controls shall be provided as specified in $\frac{\text{Section 15971}}{\text{DIRECT DIGITAL HVAC}}$ CONTROL SYSTEMS.

1.11.4 DUCTWORK COMPONENTS

The following modifications shall be made to the project specification;

1.11.4.1 Metal Ductwork

Seal Class A shall be specified for all ductwork regardless of the static pressure class. Delete the following references to seal class C and to static pressure class from the project spcification; "Static pressure Class 125, 250, and 500 Pa (1/2, 1, and 2 inch w.g.) ductwork shall meet the requirements of Seal Class C. Class 750 through 2500 Pa (3 through 10 inch) shall meet the requirements of Seal Class A."

1.11.4.2 FRP Ductwork

Round filament wound fiberglass reinforced plastic ductwork may be provided in place of metal ductwork, except for kitchen exhaust systems. Add the following paragraph to the ductwork components of the project specifications; "Round filament wound fiberglass reinforced plastic ductwork and related structures shall conform to SMACNA Industry Practice. Flanged joints shall be provided where indicated. The duct and fittings, as a finished composite, shall meet the Flame and Smoke requirements of a Class 1 duct per UL 181. Crevice-free butt lay-up joints are acceptable where flanged joints are not indicated." Change the term "fibrous glass" to "fiberglass" at all references to FRP ductwork in the project specification.

1.11.4.3 Fibrous Glass Ductwork

Rectangular fibrous glass ductwork in accordance with NAIMA AH115 shall not be provided. Delete this paragraph.

1.11.4.4 Splitters and Manual Balancing Dampers

Splitters dampers shall not be provided. Manual balancing dampers shall be provided at each branch duct and runout. Modify this paragraph in the project specification to delete all references to splitter type dampers.

1.11.4.5 Outdoor Air Intake Ducts and Plenums

Add the following paragraph to the project specifications; "Outside air intake ducts and plenums shall be fabricated with watertight soldered or brazed joints and seams and insulated as specified in Section 15080A, THERMAL INSULATION FOR MECHANICAL SYSTEMS. The plenum shall be provided with a drain at the low point. The drain shall be ran to the nearest floor

drain located in a non-finished area."

1.11.4.6 Acoustical Duct Liner

Delete this paragraph type from the specification. Duct liner shall not be provided. Delete all references to duct liner from the project specification.

1.11.4.7 Diffusers, Registers, and Grilles

Add the following sentence to the project specifications; "Fastener used to secure units should be of the same material as the diffuser, register or grilled to prevent galvanic corrosion."

1.11.4.8 Air Vents, Penthouses, and Goosenecks

Goosenecks necks shall not be provided. Except for exhaust fans serving cooking equipment, air penetrations through the roof shall be provided with a penthouses. Air vents and goosenecks shall be edited from the project specifications.

1.11.5 AIR SYSTEMS EQUIPMENT

The following modifications shall be made to the project specification;

1.11.5.1 In-Line Centrifugal Fans

Delete the following sentence from the project specifications: "Fans shall be mounted in a welded tubular casing." If fan is to be mounted above the ceiling, the fan as specified in the project specifications shall fit in the space above the ceiling. The paragraph as written requires a welded tubular fan housing, which typically requires 24" minimum to install. A square in-line fan with a much lower profile shall be provided when space is tight, but the following paragraph must be edited to specify this type of in-line fan.

1.11.5.2 Power Roof Ventilators

Except for plumbing vents, boiler vents, exhaust fans serving cooking equipment, and louvered intake penthouses, with motorized dampers at the exterior, no other mechanical equipment shall be located on the roof of the facility. The project specifications shall be modified to specify power roof ventilators to kitchen fans only. Those portions that do not apply shall be deleted from the project specifications.

1.11.5.3 Fan Sheave

The following sentence shall be added to the project specification for all fans, either individual or within air handling equipment; "A replacement sheave shall be provided during system test, adjust and balance if required to achieve system air balance."

1.11.5.4 Heating and Cooling Coils

All heating and cooling coils shall be water type coils. All other coil types shall be deleted from the project specifications.

1.11.5.5 Water Coils

Add the following sentence to the project specifications; "Coil fins shall be spaced at a maximum of 395 fins per meter."

1.11.5.6 Air Filters

At a minimum all filters, except those in kitchen hoods, shall be 50 mm (2 inch) depth, sectional, disposable type of the size indicated and shall have an average efficiency of 25 to 30 percent when tested according to ASHRAE 52.1. Filter types not provided shall be deleted from the project specifications.

1.11.6 AIR HANDLING UNITS

All Air Handling Units shall be fabricated in a factory. Units shall be single-zone draw-through type or multizone blow-through triple deck type as specified in Section 01016, MECHANICAL REQUIREMENTS. Units shall include fans, coils, airtight insulated casing, prefilters for pre cooling coils in the outside air path, filter sections in the mixed air path, adjustable V-belt drives, belt guards for externally mounted motors, access sections where indicated, combination sectional filter-mixing box, drysteam humidifier, vibration-isolators, and appurtenances required for specified operation. Air handling unit shall have published ratings based on tests performed according to ARI 430.

1.11.6.1 Casings

The first two sentences of this paragraph shall be edited as follows; "Casing sections shall be of the double wall type, constructed of a minimum 18 gauge galvanized steel, or 18 gauge steel outer casing protected with a corrosion resistant paint finish according to paragraph FACTORY PAINTING. Inner casing of double-wall units shall be minimum 1.0 mm (20 gauge) solid galvanized steel." The option for "A minimum 200 mm by 200 mm sealed glass window suitable for the intended application shall be installed in all access doors." shall be included in the project specifications when ever the air handling unit is large enough to walk into and close the access doors. Interior door handles shall also be provided in these large units.

1.11.6.2 Cooling Coils, Spray Type

Spray type coils shall be deleted from the project specifications.

1.11.6.3 Drysteam Humidifier

Add specification for drysteam humidifier dispersion tubes. Humidifier shall be supplied with a steel steam dispersion-tube which provides uniform steam distribution over the entire tube length and shall be supplied at various lengths to adequately span the widest dimension of the duct. Steam supply line to the dispersion tube shall adequately convey steam to the tube and drain any condensate to ensure dry steam in the dispersion tube. Humidifier controls shall incorporate a controlling stat, duct high-limit stat, interlock switch to fan motor and/or to sail switch in duct.

1.11.7 TERMINAL UNITS

Delete this paragraph from the project specification.

1.11.8 INSTALLATION

Add the following sentence to this paragraph: "The entire air supply and distribution system, including ductwork, dampers, air supply equipment, plenums and all other associated components shall be installed to meet the requirements of NFPA 90A."

1.11.9 Underground Ductwork

No ductwork shall be installed underground. Delete this paragraph from the project specification.

1.11.10 Exposed Ductwork

Add the following sentence to this paragraph; "Ductwork shall not be installed exposed without the approval of the contracting officer's representative except for kitchen exhaust ductwork."

1.11.11 Concealed Ducts Conveying Moisture Laden Air

1.11.11.1 FRP Ductwork

FRP Ductwork may be added to this paragraph providing the air steam is within the temperature limits of the material as stated in the manufacture's published literature.

1.11.11.2 Dryer Vent Exhaust

Dryer vent exhaust shall have smooth interior surfaces. Connectors, such as sheet metal screws, that project into the duct shall not be used.

1.12 SECTION 15990A, TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS

This guide specification covers the requirements for the testing, adjusting, and balancing (TAB) of all heating, ventilating and air conditioning systems. The Designer shall actively participate in the process, including review of all submittals contained herein and participation in TAB verification.

1.13 SECTION 15995A, COMMISSIONING OF HVAC SYSTEMS

This guide specification covers the requirements for commissioning of HVAC systems. Each mechanical system and piece of equipment shall be commissioned. A properly functioning HVAC system assures a comfortable, healthy and productive environment for the user. The contractor's mechanical designer shall be a member of the HVAC commissioning team, and shall actively participate in the process, including review of all submittals contained herein. The checklists provided in the guide specification are to be used as guides for the preparation of project checklists. The appropriate checklist shall be included in the project specification for each HVAC equipment component. The designer will add additional checklists for equipment or systems not included in this guide specification or modify the checklists where necessary for specific project requirements. If, for example, a system needs to be tested with certain internal load, each appropriate checklist should be modified to include this requirement along with specifics on how load should be generated.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION 15971

DIRECT DIGITAL HVAC CONTROL SYSTEMS

PART 1 GENERAL

1.1 SCOPE

Work covered by this section includes furnishing all plant, labor, equipment, materials, and transportation necessary for the installation of direct digital HVAC control systems required in this project.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

HVAC Control System; AE

Drawings shall be on A1 (841 by 594 mm) sheets in the form and arrangement shown. Drawings shall be readable when reduced to half scale. The drawings shall use the same abbreviations, symbols, nomenclature and identifiers shown. Each control system element on a drawing shall have a unique identifier as shown. The HVAC Control System Drawings shall be delivered together as a complete submittal. Deviations must be approved by the Contracting Officer. Drawings shall be submitted along with Submittal SD-01, Data.

HVAC Control System Drawings shall include the following:

A drawing index.

A list of symbols.

A series of drawings for each HVAC control system using abbreviations, symbols, nomenclature and identifiers as shown on the design drawings. Each control-system element on a drawing shall have a unique identifier as shown.

a. Each series of drawings for an HVAC control system shall include a schematic as shown on the contract drawings, a wiring diagram, a list of equipment with manufacturer and model number, a DDC panel arrangement drawing and an HVAC control-system sequence of operation. The sequence of operation for each HVAC control system shall be in the language and format of this specification. No operational deviations from specified sequences will be permitted without prior written approval of the Contracting Officer. The se-quence of operation shall refer to each device by

its unique identifier.

b. The wiring diagram shall show the interconnection of wires and cables to DDC panel terminal blocks and to the identified terminals of starters and packaged equipment, with necessary jumpers and ground connections. The wiring diagram shall show the labels of all conductors. All sources of power required for HVAC control systems and for packaged equipment control systems shall be identified back to the panelboard circuit breaker number, DDC panel, magnetic starter, or packaged control equipment circuit. Each power supply and transformer not integral to a starter or packaged equipment shall be shown. The connected volt-ampere load and the power supply volt-ampere rating shall be shown.

A system block diagram.

 $\ensuremath{\texttt{DDC}}$ panel/DTC installation, block diagrams, and wiring diagrams.

DDC panel/DTC physical layout and schematics.

Details of surge protection device installations.

Valve schedules. The valve schedule shall include each valve's unique identifier, size, flow coefficient (Cv), pressure drop at specified flow rate, spring range, positive-positioner range, and actuator size, supported by close-off pressure data, dimensions, operation rate, and access and clearance requirements data.

Damper schedules. The damper schedule shall contain each damper's and each actuator's identifier, nominal and actual sizes, orientation of axis and frame, direction of blade rotation, spring ranges, operation rate, positive-positioner ranges, locations of actuators and damper end switches, ar-rangement of sections in multisection dampers, and methods of connecting dampers, actuators, and linkages. The damper schedule shall include the maximum expected velocity through the damper at the intended location and the maximum leakage rate at the operating static-pressure differential. The damper schedule shall contain actuator selection data, supported by calcula-tions of the torque required to move and seal the dampers; and access and clearance requirements.

SD-03 Product Data

Service Organizations; AE

Six copies of a list of service organizations qualified to service the HVAC control system. The list shall include the service organization name, address, technical point of contact and telephone number, and contractual point of contact and telephone number.

Equipment Data; AE

The equipment data shall be in booklet form, indexed to the unique identifiers, shall consist of data sheets that document compliance with the specification and shall include a copy of each HVAC

control system bill of materials. Catalog cuts shall be in booklet form indexed by device type. Where multiple components are shown on a catalog cut, the application specific component shall be marked. Data shall include a list of qualified service organizations and their qualifications. Service organizations shall be reasonably convenient to the equipment on a regular and emergency basis, during the warranty period.

System Descriptions and Analyses; AE

System descriptions, analyses, and calculations used in required sizing equipment. Descriptions and calculations shall show how the equipment will operate as a system to meet the specified performance. The data package shall include the following:

DDC panel memory size.

DDC panel automatic start up operations.

Database update procedure.

DDC panel expansion capability and method of implementation.

DDC panel operation.

Database entry forms or data listings.

Software; AE

Manufacturer's reliability data and calculations required to show compliance with the specified reliability. Instrumentation and controls shall not be included in the calculations.

Training Data; AE

A training course in the maintenance and operation of the HVAC control systems, approved 60 days prior to the start of training. Lesson plans and training manuals for the training, including type of training to be provided, with a list of reference material. The training shall be oriented to the specific systems being installed. One training manual shall be furnished for each trainee, plus two additional copies for archival storage at the project site. The manuals shall include the agenda, the defined objectives for each lesson, and a detailed description of the subject matter for each lesson. Two copies of audiovisual materials shall be included, for archival storage at the project site, either as a part of the printed training manuals or on the same media as that to be used during the training session.

Data Entry Forms; AE

The completed data entry forms or data summaries, if data entry is done through interactive computer interfacing, utilizing all data required by the contract documents and other pertinent information required for complete installation of the database. Additional data to provide a complete and operational control system shall be identified and requested from the Government. The proposed forms shall be provided at least 90 days prior to the Contractor's

scheduled need date.

SD-03 Statements

Factory Testing; AE

Six copies of the test procedures for the factory test. The test procedures shall explain in detail, step-by-step actions and expected results to demonstrate compliance with the specified requirements, and the methods for simulating the necessary conditions of operation to demonstrate performance of the system. Written approval by the Government of the factory test procedures shall be one of the prerequisites for scheduling the factory test.

Site Testing; AE

Six copies of the test procedures for the site testing. The site testing procedures shall identify each item to be tested and shall clearly describe each test. The test procedures shall include a list of the test equipment to be used for site testing, manufacturer and model number, and the date of calibration and accuracy of calibration, within 6 months of the test date.

Performance Verification Testing and Endurance Testing; AE

Six copies of the test procedures for the performance verification test and the endurance test. The test procedures shall explain in detail, step-by-step actions and expected results to demonstrate compliance with the specified requirements. Written approval by the Government of the performance verification test procedures shall be one of the prerequisites for commencing the performance verification test. Endurance testing is not required when Johnson Controls Metasys equipment is furnished and installed.

Commissioning Procedures; AE

Commissioning procedures for each HVAC control system, and for each type of terminal unit control system. The procedures shall reflect the language and format of this specification. The commissioning procedures shall refer to the devices by their unique identifiers as shown and shall include step-by-step configuration procedures for each system. The configuration procedures shall include a configuration check sheet showing all configuration parameters. Six copies of Commissioning Procedures, in booklet form and indexed, for each system, 60 days prior to system commissioning. Commissioning procedures shall include general instructions on how to set control parameters including setpoints; proportional, integral, and derivative mode constants; contact output settings for the specific devices provided. Commissioning procedures shall be specific to each HVAC system, shall detail the steps involved, and shall refer to the procedures in the booklet for specific devices..

SD-06 Test Reports

Test Reports; AE

Six copies of the site testing data. Original copies of data produced during site testing, including results of each test

procedure, after approval of the site tests..

Performance Verification and Endurance Report; AE

Six copies of the performance verification and endurance test report after completion of a successful test. Documentation of test results for the entire HVAC control system complete, in booklet form and indexed, within 30 days after each test. Endurance testing is not required when Johnson Controls Metasys equipment is furnished and installed.

Control System Calibration, Adjustments, and Commissioning; AE

Six copies of the calibration, adjustment and commissioning report which shall include setpoints and proportional, integral and derivative mode constant settings, calibration data for instruments and controls, and all the data resulting from adjusting the control system devices and commissioning HVAC control system.

SD-07 Certificates

Air Storage Tank; AE

An ASME Air Storage Tank Certificate for each storage tank.

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; AE

The Group III Technical Data Package consisting of the operation and maintenance data in manual format. Final copies of the manuals bound in hardback, loose leaf binders, within 30 days after completing the endurance test. The manuals shall have a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning of each appendix. Each manual's contents shall be identified on the cover. The manuals shall include the names, addresses, and telephone numbers of each subcontractor installing equipment and systems, and of the nearest service representatives for each item of equipment and each system. The draft copy used during site testing shall be updated with any changes required, prior to final submission of the manual. The final copies delivered after completion of the endurance test shall include modifications made during installation checkout and acceptance. Manuals shall include:

Functional Design Manual; AE

Two copies of the functional design manual which shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes.

Hardware Manual; AE

Two copies of the hardware manual which shall describe equipment furnished, including:

General description and specifications.

Installation and checkout procedures.

Equipment electrical schematics and layout drawings.

System schematics and I/O device wiring lists.

Alignment and calibration procedures.

Manufacturer's repair parts list indicating sources of supply.

Software Manual; AE

Two copies of the software manual which shall describe the functions of all software, and shall include all other information necessary to enable proper loading, testing and operation including, but not limited to the following:

Definitions of terms and functions.

Operator commands.

System access requirements.

Data entry requirements.

Descriptions of application software.

Description of database structure and interface with programs.

Alarms.

Operator's Manual; AE

Six complete copies of operation manuals for each HVAC control system, in booklet form and indexed, outlining the step-by-step procedures required for each HVAC control system's startup, operation, and shutdown. The manuals shall include detail drawings, equipment data, and manufacturer supplied op-eration manuals for all equipment.

Maintenance Manual; AE

Six complete copies of maintenance manuals, indexed in booklet form listing maintenance procedures. The maintenance instructions shall include a maintenance check list for each HVAC control system. Maintenance manuals shall include spare parts data and recommended maintenance tool kits for all control devices. Maintenance instructions shall include recommended repair methods, either field repair, factory repair, or whole-item replacement. The manual shall contain a list of service organizations qualified to service the HVAC control system, including the service organization name and telephone number. If operation and maintenance manuals are provided in a common volume, they shall be clearly differentiated and separately indexed.

1.3 GENERAL REQUIREMENTS

The direct digital control (DDC) shall be a com-plete control system consisting of a building automation system and an auto-matic temperature control system suitable for the HVAC system. DDC shall be compatible with the existing Fort Riley EMCS automation system. DDC shall include Fort Riley LAN compatible communications cards for connection to the Fort Riley Local Area Network (LAN). Contractor shall supply all materials required and software generation necessary to enable the DDC to communicate with the Fort Riley EMCS engineering control station located in building 364. Fort Riley personnel will supply the necessary LAN drops and IP addresses.

1.3.1 Nameplates, Lens Caps, and Tags

Nameplates and lens caps bearing legends as shown and tags bearing device-unique identifiers as shown shall have engraved or stamped characters. Nameplates shall be mechanically at-tached to direct digital control (DDC) panel interior doors. A plastic or metal tag shall be mechanically attached directly to each device or attached by a metal chain or wire.

1.3.2 Verification of Dimensions

The Contractor shall become familiar with all details of the work, shall verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work.

1.3.3 Drawings

Because of the small scale of the drawings, it is not pos-sible to indicate all offsets, fittings, and accessories that may be re-quired. The Contractor shall investigate the mechanical, electrical, and finish conditions that could affect the work to be performed, shall arrange such work accordingly, and shall furnish all work necessary to meet such con-ditions.

1.3.4 Power-Line Surge Protection

Equipment connected to ac circuits shall be protected from power-line surges. Equipment protection shall meet the re-quirements of IEEE C62.41. Fuses shall not be used for surge protection.

1.3.5 Surge Protection for Transmitter and Control Wiring

DDC system con-trol-panel equipment shall be protected against surges induced on control and transmitter wiring installed outside and as shown. The equipment protection shall be tested in the normal mode and in the common mode, using the follow-ing two waveforms:

1.3.5.1 Sub Waveform

A 10 microsecond by 1,000 microsecond waveform with a peak voltage of 1,500 volts and a peak current of 60 amperes.

1.3.5.2 Sub Waveform

An 8 microsecond by 20 microsecond waveform with a peak voltage of 1,000 volts and a peak current of 500 amperes.

1.3.6 Power-Line Conditioners (PLC)

PLCs shall be furnished for each DDC panel. The PLCs shall provide both voltage regulation and noise rejection. The PLCs shall be of the ferro-resonant design, with no moving parts and no tap switching while electrically isolating the secondary from the power-line side. The PLCs shall be sized for 125 percent of the actual connected kVA load. Characteristics of the PLC shall be as follows:

1.3.6.1 85 Percent Load

At 85 percent load, the output voltage shall not deviate by more than plus or minus 1 percent of nominal when the input voltage fluctuates be-tween minus 20 percent to plus 10 percent of nominal.

1.3.6.2 Load Switching Disturbances

During load changes of zero to full load, the output voltage shall not deviate by more than plus or minus 3 percent of nominal. Full correction of load switching disturbances shall be accomplished within 5 cycles, and 95 percent correction shall be accomplished within two cycles of the onset of the disturbance.

1.3.6.3 Harmonic Distortion

Total harmonic distortion shall not exceed 3-1/2 percent at full load.

1.3.7 System Overall Reliability Requirement

The system shall be config-ured and installed to yield a mean time between failure (MTBF) of at least 40,000 hours. Each DDC panel shall be designed, configured, installed and programmed to provide for stand alone operation with minimal performance deg-radation on failure of other system components to which it is connected or with which it communicates.

1.3.8 Multiple DDC Panel Requirement

Where the system to be controlled by the DDC system is located in multiple mechanical rooms, each mechanical room shall have at least one DDC panel. DDC panels shall not control equipment located in a different mechanical room. DDC panels shall be located in the same room as the equipment being controlled or in an adjacent space which has direct access to the equipment room.

1.3.9 System Accuracy and Display

The system shall maintain an end-to-end accuracy for 1 year from sensor to operator's console display for the appli-cations specified and shall display the value as specified. Each temperature shall be displayed and printed to nearest 0.1 degree F.

1.3.9.1 Space Temperature

Space temperature with a range of 50 to 85 de-grees F. plus or minus 0.75 degree F. for conditioned space; 30 to 130 de-grees F. plus or minus 1 degree F. for unconditioned space.

1.3.9.2 Duct Temperature

Duct temperature with a range of 40 to 140 de-grees F. plus or minus 2

degrees F.

1.3.9.3 Outside Air Temperature

Outside air (OA) temperature with a range of minus 30 to plus 130 degrees F. plus or minus 2 degrees F.; with a subrange of 30 to 100 degrees F. plus or minus 1 degree F.

1.3.9.4 Water Temperature

Water temperature with a range of 30 to 100 de-grees F. plus or minus 0.75 degree F; the range of 100 to 250 degrees F. plus or minus 2 degrees F; and water temperatures for the purpose of performing Btu calculations using differential temperatures to plus or minus 0.5 degrees F. using matched sensors.

1.3.9.5 Pressure

Pressure with a range for the specific application plus or minus 2.0 percent of range display and print to nearest 0.1 inch water column.

1.3.9.6 kWh and kW Demand

kWh and kW demand with a range for the specific application plus or minus 1.0 percent of reading (display and print to near-est kWh or kW).

1.3.9.7 Analog Value Input

An analog value input to the system's equipment via an AI with a maximum error of 0.50 percent of range, not including the sensor or transmitter error. This accuracy shall be maintained over the specified environmental conditions.

1.4 TESTING

1.4.1 Factory Test

The Contractor shall assemble the factory test DDC sys-tem as specified and perform test to demonstrate that the performance of the system satisfies the requirements of this specification. Model numbers of equipment tested shall be identical to those to be delivered to the site. Original copies of all data produced, including results of each test proce-dure during factory testing shall be delivered to the Government at the con-clusion of testing, prior to Government approval of the test. The test re-sults documentation shall be arranged so that commands, responses, and data acquired are correlated in a manner which will allow for logical interpreta-tion of the data. The factory test setup shall include the following:

- 1.4.1.1 Command Entry Device with Keyboard.
- 1.4.1.2 Printer.
- 1.4.1.3 Disk Storage.
- 1.4.1.4 DDC Panel.
- 1.4.1.5 DDC Panel Test Set.

- 1.4.1.6 DDC Panel Portable Tester.
- 1.4.1.7 VAV Box Controller.
- 1.4.1.8 VAV Box Communication and Programming Device.
- 1.4.1.9 Communication links of each type and speed including Modems.
- 1.4.1.10 Dial-up Modem.
- 1.4.1.11 Software.

1.4.2 Site Testing

Personnel, equipment, instrumentation, and supplies shall be provided as necessary to perform site testing, adjusting, calibra-tion and commissioning. Wiring shall be tested for continuity and for ground, open, and short circuits. Ground rods installed by the Contractor shall be tested as specified in IEEE Std 142. Written Government approval of the spe-cific site testing procedures shall be obtained prior to any test. Written notification of any planned site testing, commissioning or tuning shall be given at least 14 calendar days prior to any test.

1.4.3 Control System Calibration, Adjustments, and Commissioning

Instru-mentation and controls shall be calibrated and the specified accuracy shall be verified using test equipment with calibration traceable to NIST stan-dards. Mechanical control devices shall be adjusted to operate as specified. Control parameters and logic (virtual) points including control loop set-points, gain constants, and integral constraints, shall be adjusted before the system is placed on line. Communications requirements shall be as indi-cated. Control system commissioning shall be performed for each HVAC system. The report describing results of functional tests, diagnostics, and calibra-tions, including written certification, shall state that the installed com-plete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include a copy of the approved performance verification test procedure.

1.4.4 Performance Verification Test

Compliance of the HVAC control system with the contract documents shall be demonstrated. Using test plans and pro-cedures previously approved, physical and functional requirements of the pro-ject, including communication requirements shall be demonstrated. The per-formance verification test procedures shall explain, step-by-step, the ac-tions and expected results that will demonstrate that the control systems perform in accordance with the sequences of operation. The performance veri-fication test shall not be started until after receipt of written permission by the Government, based on the Contractor's written certification of suc-cessful completion of site testing and training.

1.4.5 Endurance Test

The endurance test shall be used to demonstrate the specified overall system reliability requirement of the completed system. The endurance test shall not be started until the Government notifies the Contractor in writing that the performance verification test is satisfacto-rily completed. The Government may terminate the testing at any time when the

system fails to perform as specified. Upon termination of testing by the Government or by the Contractor, the Contractor shall commence an assessment period as described for Phase II. Upon successful completion of the endur-ance test, the Contractor shall deliver test reports and other documentation as specified to the Government prior to acceptance of the system. Endurance testing is not required when Johnson Controls Metasys equipment is furnished and installed.

1.4.5.1 Phase I (Testing)

The test shall be conducted 24 hours per day, 7 days per week, for 15 consecutive calendar days, including holidays, and the system shall operate as specified. The Contractor shall make no repairs dur-ing this phase of testing unless authorized by the Government in writing.

1.4.5.2 Phase II (Assessment)

After the conclusion of Phase I, the Con-tractor shall identify failures, determine causes of failures, repair fail-ures, and deliver a written report to the Government. The report shall ex-plain in detail the nature of each failure, corrective action taken, results of tests performed, and shall recommend the point at which testing should be resumed. After delivering the written report, the Contractor shall convene a test review meeting at the jobsite to present the results and recommendations to the Government. As a part of this test review meeting, the Contractor shall demonstrate that all failures have been corrected by performing appro-priate portions of the performance verification test. Based on the Contrac-tor's report and test review meeting, the Government may require that the Phase I test be totally or partially rerun. After the conclusion of any re-testing which the Government may require, the Phase II assessment shall be repeated as if Phase I had just been completed.

1.4.6 Coordination with HVAC System Balancing

The HVAC control system shall be tuned after all air-system and hydronic-system balancing has been completed, minimum damper positions set and a report issued. Commissioning may be performed prior to or simultaneous with HVAC system balancing.

1.4.7 Posted Instructions

Instructions on letter-size sheets and half-size plastic laminated drawings for each system, showing the final installed con-ditions, shall be placed in each HVAC control panel. The posted instructions shall include the control sequence, control schematic, ladder diagram, wiring diagram, valve schedules, damper schedules, commissioning procedures, and preventive maintenance instructions.

1.5 TRAINING

1.5.1 General

The training course shall be conducted for operating staff members designated by the Contracting Officer in the maintenance and opera-tion of the system, including specified hardware and software. A training day is defined as 8 hours of classroom instruction, including breaks and lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the required instruction, the Contractor shall assume that the attendees will have a high school

education or equivalent, and are familiar with HVAC systems. No training shall be scheduled until training manuals and O&M manuals have been approved by the Government.

1.5.2 Training Course Content

The course shall be taught at the project site for a period of 2 training days. The training course shall cover all the material contained in the Operating and Maintenance Instructions, the layout and location of each HVAC control panel, the layout of one of each type of unitary equipment and the locations of each, the location of each system-control device external to the panels, preventive maintenance, trou-bleshooting, diagnostics, calibration, adjustment, commissioning, tuning, and repair procedures. Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system. The re-sults of the performance verification test and the calibration, adjustment and commissioning report shall be presented as benchmarks of HVAC control-system performance by which to measure operation and maintenance effective-ness.

1.6 MAINTENANCE AND SERVICE

1.6.1 General Requirements

Services, materials and equipment shall be pro-vided as necessary to maintain the entire system in an operational state as specified for a period of 1 year after successful completion and acceptance of the Performance Verification Test. Impacts on facility operations shall be minimized.

1.6.2 Description of Work

The adjustment and repair of the system shall include the manufacturer's required adjustments of computer equipment, soft-ware updates, transmission equipment and instrumentation and control devices.

1.6.3 Personnel

Service personnel shall be qualified to accomplish work promptly and satisfactorily. The Government shall be advised in writing of the name of the designated service representative, and of any changes in per-sonnel.

1.6.4 Scheduled Inspections

Two inspections shall be performed at 6 month intervals (or less if required by the manufacturer), and all work required shall be performed. Inspections shall be scheduled in June and December. These inspections shall include:

1.6.4.1 Visual Checks

Visual checks and operational tests of all equipment.

1.6.4.2 Fan and Filter Checks

Fan checks and filter changes for all control system equipment.

1.6.4.3 Cleaning

Clean all control system equipment including interior and exterior surfaces.

1.6.4.4 Calibration

Check and calibrate each field device. Check and calibrate 50 per-cent of the total analog points during the first inspection. Check and cali-brate the remaining 50 percent of the analog points during the second major inspection. Certify analog test instrumentation accuracy to be twice that of the device being calibrated. Randomly check at least 25 percent of all digi-tal points for proper operation during the first inspection. Randomly check at least 25 percent of the remaining digital points during the second inspec-tion.

1.6.4.5 Software Checks

Run all system software diagnostics and correct all diagnosed prob-lems.

1.6.4.6 Sub Title

Resolve any previous outstanding problems.

1.6.5 Scheduled Work

This work shall be performed during regular working hours, Monday through Friday, excluding legal holidays.

1.6.6 Emergency Service

The Government will initiate service calls when the system is not functioning properly. Qualified personnel shall be avail-able to provide service to the system. A telephone number where the service supervisor can be reached at all times shall be provided. Service personnel shall be at the site within 4 hours after receiving a request for service. The control system shall be restored to proper operating condition within "1 calendar day" or 8 hours after receiving a request for service.

1.6.7 Operation

Scheduled adjustments and repairs shall include verifica-tion of the control system operation as demonstrated by the applicable tests of the performance verification test.

1.6.8 Records and Logs

Dated records and logs shall be kept of each task, with cumulative records for each major component, and for the complete system chronologically. A continuous log shall be maintained for all devices. The log shall contain all initial analog span and zero calibration values and all digital points. Complete logs shall be kept and shall be available for in-spection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished for the control system.

1.6.9 Work Requests

Each service call request shall be recorded as re-ceived and shall include the serial number identifying the component in-volved, its location, date and time the call was received, nature of trouble, names of the service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials to be used, the time and date

work started, and the time and date of completion. A record of the work performed shall be submitted within 5 days after work is accom-plished.

1.6.10 System Modifications

Recommendations for system modification shall be submitted in writing. System modifications, including operating parameters and control settings, shall not be made without prior approval of the Government. Any modifications made to the system shall be incorporated into the operations and maintenance manuals, and other documentation affected.

1.6.11 Software

Updates to the software shall be provided for system; op-erating and application software shall be updated and operation in the system shall be verified. Updates shall be incorporated into operations and mainte-nance manuals, and software documentation. There shall be at least one scheduled update near the end of the first year's warranty period, at which time the latest released version of the Contractor's software shall be in-stalled and validated.

PART 2 PRODUCTS

2.1 MATERIALS

Materials furnished under this section shall be standard products of manufacturers regularly engaged in the production of the items, and the most current design which conforms with the requirements specified.

2.2 SYSTEM DESCRIPTION AND GENERAL EQUIPMENT REQUIREMENTS

2.2.1 System Description

The HVAC control and monitoring system shall em-ploy direct digital control. Control and monitoring system shall be de-signed, programmed, and installed by engineers and field personnel directly employed by the controls contractor. The system shall be programmed to ob-tain the sequence of operation and energy management functions as indicated. direct digital control system shall be connected to the existing Johnson Controls Metasys System (UMCS) at Fort Riley that has been accepted as an ap-proved interface by the Contracting Officer. The direct digital controls shall be Johnson Controls Metasys. All controls added under this project shall be connected to a global network control unit (NCU) located in the building, and shall communicate to the basewide UMCS via the LAN serving the base. Temperature control equipment, including panels, temperature sensors, and automatic dampers, but not including tubing, fittings, wire, conduit, non-automatic valves, and other standard marketed apparatus, shall bear the nameplate of the manufacturer. All engineering design required to install a high quality direct digital control and monitoring system capable of meeting the operating requirements and sequence of operation indicated on the plans and specified herein, shall be performed by the contractor. Contractor shall ensure that all equipment to be supplied is properly sized and is capable of handling the specified load.

2.2.2 General Equipment Requirements

Units of the same type of equipment shall be products of a single manufacturer. Each major component of equip-ment shall have the manufacturer's name and address, and the model and serial number in a

conspicuous place. Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacturing of such products, which are of a similar material, design and workmanship. The stan-dard products shall have been in a satisfactory commercial or industrial use for 2 years prior to use on this project. The 2 years use shall include ap-plications of equipment and materials under similar circumstances and of similar size. The 2 years experience shall be satisfactorily completed by a product which has been sold or is offered for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products hav-ing less than a 2 year field service record will be acceptable if a certified record of satisfactory field operation, for not less than 6,000 hours exclu-sive of the manufacturer's factory tests, can be shown. The equipment items shall be supported by a service organization. Items of the same type and purpose shall be identical, including equipment, assemblies, parts and compo-nents. Automatic temperature controls shall be direct digital controls that will provide the required sequence of operation.

2.2.2.1 Electrical and Electronic Devices

Electrical and electronic de-vices not located within an HVAC control panel shall have a NEMA ICS 1 enclo-sure in accordance with NEMA 250 unless otherwise shown.

2.2.2.2 Standard Signals

All analog outputs shall output a signal within the range of 0-to-5 VDC, 0-to-10 VDC or 4-20 MA. All analog inputs shall be within a range of 0-to-5 VDC, 0-to-10 VDC, or 4-to-20 MA, depending on the application. The signals shall originate from current-sourcing devices and shall be received by current-sinking devices.

2.2.2.3 Ambient Temperature Limits

DDC panels shall have ambient condition ratings of plus 35 to 120 degrees F. and 10 to 95 percent relative humidity, noncondensing. Devices installed outdoors shall operate within limit ratings of minus 35 to 150 degrees F. Instrumentation and control elements shall be rated for continuous operation under the ambient environmental temperature, pressure, humidity, and vibration conditions specified or normally encoun-tered for the installed location.

2.3 CONDUIT, BOXES, AND FITTINGS

2.3.1 Conduit

Conduit shall be electrical metallic tubing conforming to UL 797, Schedule 40 rigid PVC conduit conforming to UL 651, Type EB and A rigid PVC conduit and HDPE conduit conforming to UL 651A, flexible metal conduit conforming to UL 1, and flexible nonmetallic tubing conforming to UL 3.

2.3.2 Boxes

Boxes shall be metallic and conform to UL 514A.

2.3.3 Fittings

Fittings for conduit and outlet boxes shall conform to UL 514B.

2.4 CABLE, WIRING, AND TERMINAL BLOCKS

2.4.1 Instrumentation Cable

Instrumentation cable shall be 18 AWG, stranded copper, single- or multiple-twisted, minimum 2 inch lay of twist, 100 percent shielded pairs, and shall have a 300-volt insulation. Each pair shall have a 20 AWG tinned-copper drain wire and individual overall pair in-sulation. Cables shall have an overall aluminum-polyester or tinned-copper cable-shield tape, overall 20 AWG tinned-copper cable drain wire, and overall cable insulation.

2.4.2 Digital Functions

Control wiring for digital functions shall be 18 AWG minimum with 600-volt insulation. Multiconductor wire shall have an outer jacket of polyvinyl chloride (PVC).

2.4.3 Analog Functions

Control wiring for analog functions shall be 18 AWG minimum with 600-volt insulation, twisted and shielded, 2-, 3-, or 4-wire to match analog function hardware. Multiconductor wire shall have an outer jacket of PVC.

2.4.4 Sensor Wiring

Sensor wiring shall be 20 AWG minimum twisted and shielded, two-, three-, or four-wire to match analog function hardware. Mul-ticonductor wire shall have an outer jacket of PVC.

2.4.5 Class 2 Low Energy Conductors

The conductor sizes specified for digital and analog functions shall take precedence over any requirements for Class 2 low energy remote-controlled and signal-circuit conductors specified elsewhere.

2.4.6 Control Wiring for 24-Volt Circuits

Control wiring for 24-volt cir-cuits shall be 18 AWG minimum and shall be rated for 300-volt service.

2.4.7 Wiring for 120-Volt Circuits

Wiring for 120-volt circuits shall be 14 AWG minimum and shall be rated for 600-volt service.

2.4.8 Terminal Blocks

Terminal blocks shall be insulated, modular, feed-through, clamp style with recessed captive screw-type clamping mechanism, shall be suitable for rail mounting, and shall have end plates and partition plates for separation or shall have enclosed sides.

2.5 ACTUATORS

2.5.1 General Requirements

Actuators shall be pneumatic for air handling unit control valves and control dampers and electric or electronic for VAV terminal unit valves and dampers. Actuators shall fail to their spring-return positions on signal

or power failure and shall have a visible position indicator. Actuators shall open or close the devices to which they are ap-plied within 60 seconds after a full scale input signal change. Electric or electronic actuators operating in parallel or in sequence shall have an aux-iliary actuator driver. Pneumatic actuators shall have non-ferrous bellows or diaphragm of neoprene or other elastomer. Bellows or diaphragm shall be of sufficient size so that a change in operating pressure of not more than 2 percent of the total motor operating will be required to start the valve or damper moving.

2.5.2 Damper Actuators

The actuators shall be provided with mounting and connecting hardware. Actuators shall smoothly operate the devices to which they are applied. Actuators shall fully open and close the devices to which they are applied and shall have a full stroke response time of 60 seconds or less. The actuator stroke shall be limited by an adjustable stop in the di-rection of power stroke.

2.5.3 Valve Actuators

Valve actuators shall be selected to provide a mini-mum of 125 percent of the motive power necessary to operate the valve over its full range of operation.

2.5.4 Positive Positioners

Positive positioners are required for pneumatic actuators. Each positive positioner shall be a pneumatic relay with a me-chanical feedback mechanism and an adjustable operating range and starting point.

2.6 AUTOMATIC CONTROL VALVES

Valves shall have stainless-steel stems and stuffing boxes with extended necks to clear the piping insulation. Valve bodies shall be designed for not less than 125 psig working pressure or 150 percent of the system operating pressure, whichever is greater. Valve leak-age rating shall be 0.01 percent of rated Cv. Unless otherwise specified, bodies for valves 1-1/2 inches and smaller shall be brass or bronze, with threaded or union ends; bodies for 2 inch valves shall have threaded ends; and bodies for valves 2 to 3 inches shall be of brass, bronze or iron. Bod-ies for valves 2-1/2 inches and larger shall be provided with flanged-end connections.

2.6.1 Butterfly-Valve Assembly

Butterfly valves shall be threaded lug type suitable for dead-end service and modulation to the fully-closed position, with carbon-steel bodies and noncorrosive discs, stainless steel shafts sup-ported by bearings, and EPDM seats suitable for temperatures from 20 to 250 degrees F. Valves shall have a manual means of operation independent of the actuator.

2.6.2 Two-Way Valves

Two-way modulating valves shall have equal-percentage characteristics.

2.6.3 Three-Way Valves

Three-way valves shall provide linear flow control with constant total flow throughout full plug travel.

2.6.4 Duct Coil and Terminal-Unit Coil Valves

Control valves with either flare-type or solder-type ends shall be provided for duct or terminal-unit coils. Flare nuts shall be furnished for each flare-type end valve.

2.6.5 Valves for Chilled Water, Service

Internal valve trim shall be bronze except that valve stems may be type 316 stainless steel. Valves 4 inches and larger shall be butterfly.

2.6.6 Valves for Hot Water Service

For hot water service below 250 degrees F. internal trim (including seats, seat rings, modulating plugs, and springs) of valves controlling water hotter than 210 degrees F. shall be Type 316 stainless steel. Internal trim for valves controlling water 210 degrees F. or less shall be brass or bronze. Nonmetallic parts of hot-water control valves shall be suitable for a minimum continuous operating temperature shall be suitable for a minimum continuous operating temperature of 250 degrees F. or 50 degrees F. above the system design temperature, whichever is higher. Valves 4 inches and larger shall be butterfly valves.

2.6.7 Maximum Pressure Drop Through Valve

Modulating water flow valve pressure drop shall be greater of 10 feet of water or 50 percent of the pres-sure drop through the device.

2.7 CONTROLLERS

Controllers shall be direct digital, field programmable, microprocessor based units with energy management functions that provide lo-cal display capability via an existing network terminal or existing laptop workstation. Digital system controller shall perform its assigned control and energy management functions as a stand-alone unit. The digital system controller shall be UL approved and listed as a signal system. The digital system controller shall perform its full control and energy management func-tions, regardless of condition of communications link with the energy manage-ment system.

2.8 DAMPERS

2.8.1 Damper Assembly

A single damper section shall have blades no longer than 48 inches and shall be no higher than 72 inches. Maximum damper blade width shall be 8 inches. Larger sizes shall be made from a combination of sections. Dampers shall be steel, or other materials where shown. Flat blades shall be made rigid by folding the edges. Blade-operating linkages shall be within the frame so that blade-connecting devices within the same damper section shall not be located directly in the air stream. Damper axles shall be 0.5 inch minimum, plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically shall be sup-ported by thrust bearings. Pressure drop through dampers shall not exceed 0.04 inch water gauge at 1,000 feet per minute) in the wide-open position. Frames shall not be less than 2 inches in width. Dampers shall be tested in accordance with AMCA 500.

2.8.2 Operating Links

Operating links external to dampers, such as crank-arms, connecting rods, and line shafting for transmitting motion from damper actuators to dampers, shall withstand a load equal to at least twice the maximum required damper-operating force. Rod lengths shall be adjustable. Links shall be brass, bronze, zinc-coated steel, or stainless steel. Working parts of joints and clevises shall be brass, bronze, or stainless steel. Ad-justments of crankarms shall control the open and closed positions of damp-ers.

2.8.3 Outside Air, Return Air, and Relief Air Dampers

Dampers shall be parallel blade type. Outside air, re-turn air and relief air dampers shall be provided where shown. Blades shall have interlocking edges and shall be provided with compressible seals at points of contact. The channel frames of the dampers shall be provided with jamb seals to minimize air leakage. Dampers shall not leak in excess of 20 cfm per square foot at 4 inches water gauge static pressure when closed. Seals shall be suitable for an operating temperature range of minus 40 de-grees F. to 200 degrees F. Dampers shall be rated at not less than 2,000 feet per minute air velocity.

2.9 INSTRUMENTATION

2.9.1 Measurements

Each transmitter shall have offset and span adjust-ments. Transmitters shall be calibrated to provide the following measure-ments, over the indicated ranges, for a linear output of 0-to-5 VDC, 0-to-10 VDC and 4-20 mA where applicable:

2.9.1.1 Conditioned Space Temperature

Conditioned space temperature, from 50 to 85 degrees F.

2.9.1.2 Duct Temperature

Duct temperature, from 40 to 140 degrees F. except that return air temperature for economizer operation shall be minus 30 to plus 130 degrees F.

2.9.1.3 Chilled Water Temperature

Chilled water temperature, from 30 to 100 degrees F.

2.9.1.4 Heating Hot Water Temperature

Heating hot water temperature, from 100 to 250 degrees F.

2.9.1.5 Outside Air Temperature

Outside air temperature, from minus 30 to plus 130 degrees F.

2.9.1.6 VAV Supply Differential Pressure

Differential pressure for VAV supply duct static pressure from 0 to 2.0 inches water gauge.

2.9.1.7 Pitot Tube Air Flow Measurement Station

Pitot tube air flow measurement station and transmitter, from 0 to 0.1 inch water gauge for flow velocities of 500 to 1,200 fpm; 0 to 0.25 inch water gauge for velocities of 500 to 1,800 fpm; or 0 to 0.5 inch water gauge for velocities of 500 to 2,500 fpm.

2.9.1.8 Electronic Air Flow Measurement Station

Electronic air flow measurement station and transmitter, from 125 to 2,500 fpm.

2.9.2 Temperature Instruments

2.9.2.1 Resistance Temperature Detectors (RTD)

Each RTD shall be two-wire 1000 ohm platinum with a tolerance of plus or minus 0.1 percent at 0 degrees F., and shall be encapsulated in epoxy, series 300 stainless steel, anodized aluminum, or copper. Only 2-wire 1000 ohm platinum RTD's shall be utilized in temperature sensing applications unless excessive cable length is a fac-tor.

2.9.2.2 Continuous Averaging RTD

Continuous averaging RTDs shall have a tolerance of plus or minus 1.0 degree F. at the reference temperature, and shall be of sufficient length to ensure that the resistance represents an av-erage over the cross section in which it is installed. The sensing element shall have a bendable copper sheath. Each averaging RTD shall be furnished with an RTD transmitter to match the resistance range of the averaging RTD.

2.9.3 Differential Pressure Instruments

The instrument shall be a pressure transmitter with an integral sensing element. The instrument over pressure rating shall be 300 percent of the operating pressure. The sensor/trans-mitter assembly accuracy shall be plus or minus 2 percent of full scale. The transmitter shall be a 2 or 3 wire device. The transmitter shall produce a linear 0-to-5 VDC, 0-to-10 VDC or 4-20 mA where applicable, output corre-sponding to the required pressure measurement. 4-20 mA devices shall be loop powered.

2.9.4 Thermowells

Thermowells shall be Series 300 stainless steel with threaded brass plug and chain, 2 inch lagging neck and extension type well. Inside diameter and insertion length shall be as required for the applica-tion.

2.9.5 Sunshields

Sunshields for outside air temperature sensing elements shall prevent the sun from directly striking the temperature sensing ele-ments. The sunshields shall be provided with adequate ventilation so that the sensing element responds to the ambient temperature of the surroundings. The top of each sunshield shall have a galvanized metal rainshield projecting over the face of the sunshield. The sunshields shall be painted white.

2.10 PRESSURE SWITCHES AND SOLENOID VALVES

2.10.1 Pressure Switches

Each switch shall have an adjustable setpoint with visible setpoint scale. Range shall be as shown. Differential adjust-ment shall span 20 to 40 percent of the range of the device.

2.10.2 Differential Pressure Switches

Each switch shall be an adjustable diaphragm-operated device with two SPDT contacts, with taps for sensing lines to be connected to duct pressure fittings designed to sense air pressure. These fittings shall be of the angled-tip type with tips pointing into the air stream. Range shall be 5.0 to 6.0 inches water gauge. Differential shall be a maximum of 0.15 inch water gauge at the low end of the range and 0.35 inch water gauge at the high end of the range.

2.11 RELAYS

Control relay contacts shall have utilization category and ratings selected for the application, with a minimum of two sets of contacts (two normally open, two normally closed) enclosed in a dustproof enclosure. Relays shall be rated for a minimum life of one million operations. Operat-ing time hall be 20 milliseconds or less. Relays shall be equipped with coil transient suppression devices to limit transients to 150 percent of rated coil voltage. Time delay relays shall be 2 PDT with 8-pin connectors, dust cover, and a matching rail mounted socket. Adjustable timing range shall be 0 to 3 minutes. Power consumption shall not be greater than 3 watts.

2.12 CURRENT SENSING RELAYS

Current sensing relays shall provide a nor-mally open contact rated at a minimum of 50 volts peak and 0.5 ampere or 25 VA, noninductive. There shall be a single hole for passage of current carry-ing conductors. The devices shall be sized for operation at 50 percent rated current based on the connected load. Voltage isolation shall be a minimum of 600 Volts.

2.13 SMOKE DETECTORS

Smoke detectors shall be as specified in SECTION 16721, ADDRESSABLE FIRE DETECTION AND ALARM SYSTEM.

2.14 THERMOSTATS

2.14.1 General

Thermostat ranges shall be selected so that the setpoint is adjustable without tools between plus or minus 10 degrees F. of the setpoint. Thermostats shall be electric or low-voltage electronic.

2.14.2 Nonmodulating Room Thermostats

Contacts shall be single-pole dou-ble-throw (SPDT), hermetically sealed, and wired to identified terminals. Maximum differential shall be 5 degrees F. Room thermostats shall be en-closed with separate locking covers (guards).

2.14.3 Room Temperature Sensors

Room sensors shall be constructed for ei-ther surface or wall box mounting. Room sensors shall have the following op-tions:

2.14.3.1 Setpoint Reset

Setpoint reset slide switch providing a +/- 3 degree (adjust-able)range.

2.14.3.2 Heating/Cooling Setpoint

Individual heating/cooling setpoint slide switches for heating and cooling systems.

2.14.3.3 Thermometer

Analog thermometer.

2.14.4 Nonmodulating Capillary Thermostats and Aquastats

Each thermostat shall have a capillary length of at least 5 feet, shall have adjustable di-rect reading scales for both setpoint and differential, and shall have a dif-ferential adjustable from 6 to 16 degrees F. Aquastats shall be of the strap-on type, with 10 degrees F. fixed differential.

2.14.5 Freezestats

Standard type freeze stats shall not be provided. The equipment is protected from freezing by the glycol mixture of the heating and cooling fluids. The control systems shall send an alarm through the EMCS and shut down the equipment when an averaging type sensor reports the delivery of air at a freezing temperature from any system within the facility. The equipment shall require manual reset at either the local control panel or by the EMCS. Low temperature averaging safety sensors shall be as specified for other averaging type sensors in the air stream and may or may not be required to preform another control function.

2.15 CURRENT TO PNEUMATIC (IP) TRANSDUCERS

The transducers shall be two- wire-current-to-pressure transmitter that converts a 0-to-10 VDC input signal to 21-to-103 KPA (3-to-15 psig), or a 103-to-21 KPA (15-to-3 psig), pneumatic output, with a conversion accuracy of plus or minus two percent of full scale, including linearity and hysteresis. Input impedance shall not exceed 250 ohms. Air consumption shall not be greater than 0.12 L/s.

2.16 WATT-HOUR TRANSDUCERS

Watt-hour transducers shall have an accuracy of plus or minus 0.25 percent of full scale for kW and kWh outputs from full lag to full lead power factor. Input ranges for kW and kWh transducers shall be selectable without requiring the changing of current or potential transform-ers. The output shall be 4-to-20 mAdc.

2.17 FIELD HARDWARE

2.17.1 Direct Digital Control (DDC) Panel Hardware

DDC panels shall be mi-crocomputer based with sufficient memory to perform specified DDC panel func-tions and operations. The panel shall not be dependent on logic or data from an external computer. The panel shall contain necessary I/O functions to connect to field sensors and control

devices.

2.17.1.1 DDC Panel Features

The DDC panel shall include:

Main power switch.

Power on indicator.

Portable tester connector.

On-Off-Auto switches for each digital output. The status of these switches will be available to the DDC panel for further processing.

Minimum-Maximum-Auto switches, or Auto-Manual switches with manual potentiometer, for each analog output. The status of these switches will be available to the DDC panel for further processing.

2.17.1.2 Sealed Battery Backup

A sealed battery backup for the DDC panel memory and real time clock function sufficient to maintain them for a minimum period of 8 hours shall be provided. Automatic charging of batteries shall be provided, or alternately, lithium batteries sized to provide a minimum of 30 days operation and a shelf life of 2 years shall be provided. A low bat-tery alarm with indication for each DDC panel shall be provided. Alterna-tively, capacitors may be provided to maintain memory and clock function for a minimum of 8 hours.

2.17.1.3 Electrical Service Outlet for use with Test Equipment

A single phase, 120 Vac electrical service outlet for use with test equipment shall be furnished either inside or within 6 feet of he DDC panel enclosure.

2.17.1.4 Locking Type Mounting Cabinets

Locking type mounting cabinets, with common keying and door switch wired to and DDC panel input for intrusion alarm annunciation, shall be furnished.

2.17.1.5 Failure Mode

Upon failure of the DDC panel, all connected points shall be forced to the failure mode shown in the I/O summary tables.

2.17.1.6 Portable Tester

Provisions for connection of a portable tester shall be furnished at each DDC panel location.

2.17.1.7 I/O Functions

I/O functions shall be provided as part of the DDC panel and shall be in accordance with the following:

The Analog Input (AI) function shall monitor each analog input, perform A-to-D conversion, and hold the digital value in a buffer for interrogation. The A-to-D conversion shall have a minimum

resolution of 10 bits plus sign. Signal conditioning shall be provided for each analog input. Analog inputs shall be individually calibrated for zero and span, in hardware or in software. The AI shall incorporate common mode noise rejection of 50 dB from 0 to 100 Hz for differential inputs, and normal mode noise rejection of 20 dB at 60 Hz from a source impedance of 10,000 ohms. Input ranges shall be within the range of 0-to-5 VDC, 0-to-10 VDC or 4-20 mA where applicable.

The Analog Output (AO) function shall accept digital data, perform D-to-A conversion, and output a signal within the range of 0-to-5 VDC, 0-to-10 VDC and 4-20 mA where applicable. D-to-A conversion shall have a minimum resolution of 8 bits plus sign. Analog outputs shall be individually calibrated for zero and span. Short circuit protection on voltage outputs and open circuit protection on current outputs shall be provided. An indi-vidual gradual switch for manual override of each analog output and means of physically securing access to these switches shall be provided. Each AO shall have a three-position switch for selection of the DDC control signal, no control, or a locally generated control signal for connection to the con-trolled device. Feedback shall be provided to the system as to the status of the output (manual control or automatic). Switches for pneumatic control outputs shall provide a connection for an externally generated pneumatic sig-nal. All switches shall be either of a key operated design with the same keying system used for other outputs or otherwise suitably protected from un-authorized access.

The Digital Input (DI) function shall accept on-off, open-close, or other change of state (two state data) indications. Isolation and protection against an applied steady-state voltage up to 180 Vac peak shall be provided.

The Digital Output (DO) function shall provide contact closures for momentary and maintained operation of output devices. Closures shall have a minimum duration of 0.1 second. DO relays shall have an initial breakdown voltage between contacts and coil of at least 500 V peak. Electromagnetic interference suppression shall be furnished on all output lines to limit transients to nondamaging levels. Protection against an applied steady-state voltage up to 180 Vac peak shall be provided. Minimum contact rating shall be 1 ampere at 24 Vac. Key locked HOA switches shall be provided for manual override of each digital output. Feedback shall be provided to the system as to the status of the output (manual control or automatic). All switches shall be common keyed.

The pulse accumulator function shall have the same characteris-tics as the DI. In addition, a buffer shall be provided to totalize pulses and allow for interrogation by the DDC panel. The pulse accumulator shall accept rates up to 20 pulses per second. The totalized value shall be reset to zero upon operator's command.

Signal conditioning for sensors shall be provided as specified.

2.17.2 Portable Workstation/Tester

An IBM compatible personal computer (notebook) shall be provided for use with DDC panels. Portable work-station/tester is not required when Johnson

Controls Metasys equipment is furnished and installed.

2.17.2.1 Computer Capabilities

The workstation/tester shall be provided with communications interfaces to each DDC panel and shall:

Allow for entry of database information, including parameters and constraints from the keyboard.

Display any digital, analog, and pulse accumulator input.

Control any digital and analog output.

Provide operator interface in alphanumeric and decimal.

Disable/enable any DDC panel.

2.17.2.2 Computer Features

The workstation/tester shall include the fol-lowing features as a minimum:

Microsoft Windows 2000 software.

Pentium III or IV microprocessor running at 500MHz.

14.0 inch XGA TFT display.

64MB 100 MHz SDRAM.

5GB hard drive.

1.44MB, 3.5 inch diskette drive.

32x max variable CD-ROM drive.

8MB graphics card.

56K capable data/fax modem.

Sound card.

Network interface card.

On-board mouse.

2.17.2.3 Communications

A port and proper cabling shall be provided to al-low for communications between the portable workstation/tester and the DDC panel.

2.17.3 Communication Equipment

The DDC panel shall be equipped with LAN card and hardware to allow for communication over Data Transmission Media (DTM) using the communication network.

2.18 DIRECT DIGITAL CONTROL PANEL SOFTWARE

Each DDC panel, shall contain an operating system that controls and schedules that DDC panel's activities in real time. The DDC panel shall maintain a point database in its RAM that includes all parameters, constraints, and the latest value or status of all points connected to that DDC panel. The operating system shall include a real time clock function that maintains the seconds, minutes, hours, date and month, including day of the week. The operating system shall allow local loading of software and data files from the portable tester and from an op-erator interface panel. Graphic Programming Language (GPL) shall be utilized for programming. In the event there is program loss in the field DDC, the program will be downloaded automatically from the PC workstation archive com-puter in Building 364.

2.18.1 Command Priorities

A scheme of priority levels shall be provided to prevent interaction of a command of low priority with a command of higher priority. The system shall require the latest highest priority command ad-dressed to a single point to be stored for a period of time longer than the longest time constraint in the on and off states, ensuring that the correct command will be issued when the time constraint is no longer in effect or re-port the rejected command. Override command entered by the operator shall have higher priority than those emanating from application programs.

2.18.2 DDC Panel Startup

The DDC panel shall have startup software that causes automatic commencement of operation without human intervention, in-cluding startup of all connected I/O functions. A DDC panel restart program based on detection of power failure at the DDC panel shall be included in the DDC panel software. Upon restoration of power to the DDC panel, the program shall restart all equipment and restore all loads to the state at time of power failure, or to the state as commanded by time programs or other over-riding programs. The restart program shall include start time delays between successive commands to prevent demand surges or overload trips. The startup software shall initiate operation of self-test diagnostic routines. Upon failure of the DDC panel and if the database and application software are no longer resident, or if the clock cannot be read, the DDC panel shall not re-start and systems shall remain in the failure mode until the necessary re-pairs are made. If the database and application programs are resident, the DDC panel shall resume operation after an adjustable time delay of from 0 to 600 seconds. The startup sequence for each DDC panel shall include a unique time delay setting when system operation is initiated.

2.18.3 DDC Panel Operating Mode

Each DDC panel shall control and monitor all functions independent of communication with any other source. The soft-ware shall perform DDC panel functions and DDC panel resident application programs using data obtained from I/O functions and based upon the DDC panel real time clock function. The DDC panel software shall execute commands af-ter performing constraint checks in the DDC panel.

2.18.4 DDC Panel Failure Mode

Upon failure for any reason, the system shall perform an orderly shutdown and force all DDC panel outputs to a prede-termined state, consistent with the failure modes defined in the $\rm I/O$ summary tables and the associated

controlled devices.

2.18.5 DDC Panel Functions

Software necessary to accomplish the following functions, as appropriate, fully implemented and operational, within the DDC panel shall be provided:

Scanning of inputs.

Control of outputs.

Store alarms for reporting when requested.

Maintain real time.

Execute DDC panel resident application programs.

Averaging or filtering of each analog input.

Constraint checks, prior to command issuance.

DDC panel diagnostics.

DDC panel portable tester operation.

2.18.6 Analog Monitoring

The DDC panel shall measure analog values and shall be capable of transmitting analog values for display. An analog change in value is defined as a change exceeding a preset differential value as specified. Displays and reports shall express analog values in proper engi-neering units with polarity sign. The system shall accommodate up to 255 different sets of engineering unit conversions. Each engineering unit conversion shall include range, span, and conversion equation.

2.18.7 Logic (Virtual) Points

Logic (virtual) points shall be software points entered in the point database which are not directly associated with a physical I/O function. This value shall be created by calculating it from any combination of digital and analog points, or other data. Logic points shall be analog or digital points having all the properties of real points, including alarms, without the associated hardware. Logic points shall be defined or calculated and entered into the database by the Contractor as required. The calculated analog point shall have point identification in the same for-mat as any other analog point. The calculated point shall be used in any program where the real value is not obtainable directly. Calculated point values shall be current for use by the system within 30 seconds of the time any input value changes and shall include:

Control loop setpoints.

Control loop gain constants.

Control loop integral constants.

Summer/winter operation.

Real time.

Scheduled on/off times.

Equipment run-time targets.

Calculated point values.

2.18.8 I/O Point Definition

Each I/O point shall be defined in a database in the DDC panel. The definition shall include all physical parameters and constraints associated with each point.

2.18.9 Parameter Definition

Each I/O point shall be defined and entered into the database by the Contractor, including as applicable:

Name.

Device or sensor type (i.e., sensor, control, motors).

Point identifications number.

Area.

Sensor range.

Controller range.

Sensor span.

Controller span.

Engineering units conversion (scale factor).

High and low reasonableness value (analog).

High and low alarm limit (analog).

High and low alarm limit differential (return to normal).

Analog change differential (for reporting).

High accumulator limit (pulse).

Status description (digital inputs).

2.18.10 Alarm Processing

Each DDC panel shall have alarm processing soft-ware for digital, analog, and pulse accumulator alarms for all input and vir-tual points connected to that DDC panel.

2.18.10.1 Digital Alarms Definition

Digital alarms are those abnormal con-ditions indicated by digital inputs as specified in the ${\rm I/O}$ Summary Tables and elsewhere.

2.18.10.2 Analog Alarms Definition

Analog alarms are those conditions higher or lower than a defined value, as measured by an analog input as specified in the I/O Summary Tables and elsewhere. Analog readings shall be compared to predefined high and low limits, and alarmed each time a value en-ters or returns from a limit condition. Unique high and low limits shall be assigned to each analog point in the system. Analog alarm limits shall be stored in the DDC panel database. Each analog alarm limit shall have an associated unique limit differential specifying the amount by which a variable must return to the proper operating range before being declared as a return-to-normal state. Limits and differentials shall be entered on line by the operator in limits or the measured variable, without interruption or loss of monitoring of the point concerned.

2.18.10.3 Pulse Accumulator Alarms Definition

Pulse accumulator alarms are those conditions calculated from totalized values of accumulator inputs or pulse accumulator inputs rates that are outside defined limits as specified in the I/O Summary Tables and elsewhere. Pulse accumulator totalized values shall be compared to predefined limits and alarmed each time a value enters a limit condition. Unique limits shall be assigned to each pulse accumulator point in the system. Limits shall be stored in the DDC panel database.

2.18.10.4 Equipment Constraints Definitions

Each control point in the da-tabase shall have DDC panel resident constraints defined and entered by the Contractor, including as applicable:

Minimum off time.

Minimum on time.

High limit (value in engineering units). d. Low limit (value in engineering units).

2.18.10.5 Constraint Checks

Control devices connected to the system shall have the DDC panel memory resident constraints checked before each command is issued to ensure that no equipment damage will result from improper opera-tion. Each command shall be executed by the DDC panel only after all con-straint checks have been passed. Each command point shall have unique con-straints assigned. High and low "reasonableness" values or one differential "rate-of-change" value shall be assigned to each analog input. Values out-side the reasonableness limits shall be rejected and an alarm generated. Status changes and analog point values shall be reported upon request, such as for reports, and application programs. Each individual point shall be ca-pable of being selectively disabled by the operator. Disabling a point shall prohibit monitoring and automatic control of that point.

2.18.11 DDC Panel Diagnostics

Each DDC panel shall have self-test diagnos-tic routines implemented in firmware. The tests shall include routines that exercise memory. Diagnostic software shall be provided for use in the port-able tester. The software shall display messages in plain language to inform the tester's operator of diagnosed problems.

2.18.12 Summer/Winter Operation Monitoring

The system shall provide soft-ware to change the operating parameters, monitoring of alarm limits, and start-stop schedules for each mechanical system where such a change from sum-mer to winter and vice versa is meaningful. The software shall provide com-mands to application programs to coordinate summer or winter operation.

2.18.13 Control Sequences and Control Loops

Operator commands shall be used to create and execute control sequences and control loops for automated control of equipment based on operational parameters including times and events, defined in the database. Through the command entry device, the sys-tem shall prompt the operator for information necessary to create, modify, list, and delete control sequences and Proportional-Integral (PI) control loops. The system shall prompt the operator for confirmation that the con-trol sequence and control loop addition/modification/deletion is correct, prior to placing it in operation. Mathematic functions required shall be available for use in creating the control sequences and control loops. Suf-ficient spare memory shall be provided to allow four control sequences and four control loops in addition to those necessary to implement the require-ments specified for each DDC panel. Each control sequence shall accommodate up to eight terms or devices.

2.18.13.1 Control Functions

The DDC panel shall provide the following control functions:

Two Position Control: This function shall provide control for two state device control by comparing a setpoint against a process variable and an established deadband.

Floating Point Control: This function shall exercise control when an error signal exceeds a selected deadband, and shall maintain control until the error is within the deadband limits.

Signal Selection: This function shall allow the selection of the highest or lowest analog value from a group of analog values as the basis of control. The function shall include the ability to cascade analog values so that large numbers of inputs, up to a maximum of 20, can be reduced to one or two outputs.

Reset Function: This function shall develop an analog output based on up to two analog inputs and one operator specified reset schedule.

Self Tuning: The controller shall provide self tuning operation to proportional, integral and derivative modes of control and shall modify the mode constants as required.

2.18.13.2 DDC Panel Resident Applications Software

Application software required to achieve the sequences of operation, parameters, constraints, and interlocks necessary to provide control of the systems connected to the DDC system shall be provided. Application software shall be resident and execut-ing in the DDC panel, and shall be coordinated to ensure that no conflicts or contentions remain unresolved.

2.18.14 Communication Programs

The DDC panels shall be equipped with soft-ware drivers and handlers which allow for full communication and interface of all points with an existing operator workstation located in the Administra-tion Building No. 364. The software drivers shall allow for communications via modems, line drivers, transmitters/receivers over LAN, wirelines, fiber optic or coaxial cables. The software shall be structured to support communication over a network with star, ring, radial, or a combination of topolo-gies. Each communication program module shall be functionally independent of other Contractor-furnished software, to allow for future upgrade or replace-ment of communication modules without affecting other application programs and other software modules. Communication protocol for communication shall conform to a standard communication protocol.

2.19 EXISTING ENERGY MANAGEMENT SYSTEM INTERFACE

The network control unit shall be interfaced to the existing UMCS by physical connection to the base-wide LAN. The existing UMCS shall provide global capabilities for the moni-toring and control of the network controller.

2.19.1 Existing EMS Software Interface

2.19.1.1 Network Controller Panel

All points in the network controller panel shall be able to be used in all of the UMCS software application features. This integration shall be done on-line through the UMCS's system programming.

2.19.1.2 Network Controller Programming Language

The network controller programming language shall be designed for HVAC and energy management applications. All digital system controller pro-gramming, editing, and data base generation, as well as definition of the monitor, control, and reporting functions shall be performed on-line at the UMCS operator station.

2.19.1.3 Network Controller Programs

The network controller programs shall be stored both in the individual panel and in the mass storage device at the existing UMCS front end. The network controller shall accept downloading of the software program from the UMCS.

2.19.2 New Point Definition

The control contractor shall provide technical service to define the new network controller monitoring and control points at the existing UMCS workstation. In addition, the control contractor shall im-plement those points into any UMCS software programs at the Contracting Offi-cer's discretion.

2.20 OPERATOR INTERFACE

2.20.1 Command Entry/ Selection Process

Operator interface software shall minimize operator training through the

use of English language prompting and English language point identification.

2.20.2 Text-Based Display

The Operator interface shall provide consistent text-based displays of all system point and application data described in this specification. Point identification, engineering units, status indica-tion, and application naming conventions shall be the same at all operator devices.

2.20.3 Password Protection

Multiple-level password access protection shall be provided to allow the user/manager to limit control, display, and data base manipulation capabilities as he deems appropriate for each user, based upon an assigned password.

2.20.3.1 Common Passwords

Passwords shall be exactly the same for all operator devices.

2.20.3.2 Levels of Access

A minimum of three levels of access shall be supported.

2.20.3.3 Quanity of Passwords

A minimum of 4 passwords shall be supported at each Digital Panel.

2.20.3.4 Access Limits

Operators will be able to perform only those commands available for their respective passwords. Menu selections displayed at any operator device shall be limited to only those items defined for the access level of the password used to log-on.

2.20.3.5 Log-Off Timers

User-definable, automatic log-off timers of from 1 to 60 minutes shall be provided to prevent operators from inadvertently leaving devices on-line.

2.20.4 Operator Commands

The operator interface shall allow the operator to perform commands including, but not limited to, the following:

Start-up or shutdown selected equipment.

Adjust setpoints.

Add/Modify/Delete time programming.

Enable/Disable process execution.

Lock/Unlock alarm reporting for each point.

Enable/Disable Totalization for each point.

Enable/Disable Trending.

Enter temporary override schedules.

Define Holiday Schedules.

Change time/date.

Enter/Modify analog alarm limits.

Enable/Disable demand limiting.

Enable/Disable duty cycle.

2.20.5 Logs and Summaries

Reports shall be generated manually, and di-rected to the displays. As a minimum, the system shall allow the user to easily obtain the following types of reports:

2.20.5.1 General System Points

A general listing of all points in the system shall include, but not be limited to, the following:

Points currently in alarm.

Off-line points.

Points currently in override status.

Points in Weekly Schedules.

Holiday Programming.

2.20.5.2 Point Summaries

Summaries shall be provided for specific points, for a logical point group, for a user-selected group of groups, or for the entire facility without restriction due to the hardware configuration of the facility management system.

2.20.5.3 System Information Access

Under no conditions shall the operator need to specify the address of hardware controller to obtain system information.

2.20.6 Energy Saving Reports

Software shall be capable of generating monthly energy savings reports. These reports shall include each HVAC system with the associated savings printed out in actual dollars and cents saved. The savings would be generated by utilizing energy saving routines included in software.

2.20.7 System Configuration and Definition

All temperature and equipment control strategies and energy management routines shall be definable by the operator. System definition and modification procedures shall not interfere with normal system operation and control.

2.20.7.1 Functions

The system shall be provided complete with all equip-ment and documentation necessary to allow an operator to independently per-form the following functions:

Add/Delete/Modify Application Specific Controllers.

Add/Delete/Modify points of any type, and all associated point parameters, and tuning constants.

Add/Delete/Modify alarm reporting definition for each point.

Add/Delete/Modify energy management applications.

Add/Delete/Modify time and calendar-based programming.

Add/Delete/Modify Totalization for every point.

Add/Delete/Modify Historical Data Trending for every point.

Add/Delete/Modify configured control processes.

Add/Delete/Modify dial-up telecommunication definition.

Add/Delete/Modify all operator passwords.

Add/Delete/Modify Alarm Messages.

2.20.7.2 Programming Description

Definition of operator device characteristics, DDC Panels, individual points, applications and control sequences shall be performed through fill-in-the-blank templates.

Network-Wide Strategy Development: Inputs and outputs for any process shall not be restricted to a single DDC Panel but shall be able to include data from any and all other DDC panels to allow the development of network-wide control strategies.

2.20.7.3 System Definition/Control Sequence Documentation

All portions of system definition shall be self-documenting to provide hard copy printouts of all configuration and application data.

2.20.7.4 Data Base Save/Restore/Back-up

Back-up copies of all digital panel data bases shall be stored in at least one personal computer. Users shall also have the ability to manually execute downloads of digital panel data base. The Network/Data base shall also be stored on a rewritable CD ROM or magnetic tape.

2.20.8 Dynamic Color Graphic Displays

Color graphic floor plan displays, and system schematics for each piece of mechanical equipment, including air handling units, chilled water systems, and hot water boiler systems, shall be generated to optimize system performance analysis and speed alarm recognition. The existing operator interface workstation located in Building 364 is available for operator

interface provided the existing Johnson Metasys System is utilized. If another vendor is proposed, a new graphics package and op-erator workstation shall be provided with the proposed system, in addition to interfacing with the existing Metasys system.

2.20.8.1 System Selection/Penetration

The operator interface shall allow users to access the various system schematics and floor plans via a graphical penetration scheme, menu selection, or text-based commands.

2.20.8.2 Dynamic Data Displays

Dynamic temperature valves and status indi-cation shall be shown in their actual respective locations and shall auto-matically update to represent current conditions without operator interven-tion.

2.20.8.3 Graphics Definition Package

Graphic generation software shall be provided to allow the user to add, modify, or delete system graphic displays.

The contractor shall provide libraries of pre-engineered screens and symbols depicting standard air handling unit components (e.g., fans, cooling coils, filters, dampers, etc.); complete mechanical systems (e.g., constant volume-terminal reheat, VAV, etc.) and electrical symbols.

The graphic development package shall use a mouse or similar pointing device in conjunction with a drawing program to allow the user to perform the following:

Define symbols.

Position and size symbols.

Define background screens.

Define connecting lines and curves.

Locate, orient and size descriptive text.

Define and display colors for all elements.

Establish correlation between symbols or text and associated system points or other displays.

Graphical displays can be created to represent any logical group-ing of system points or calculated data based upon building function, me-chanical system, building layout, or any other logical grouping of points which aids the operator in the analysis of the facility. To accomplish this, the user shall be able to build graphic displays that include point data from multiple application specific controllers.

2.20.9 Personal Computer Operator Interface

The personal computer shall remotely connect to the network of digital panels. Operator workstation shall be located in the EMCS Shop, building

364. At Contractor's option, the existing operator work station in building 364 may be utilized for the build-ing DDC system operator interface provided a Johnson Metasys system is fur-nished for the buildings in this contract. The existing software shall be modified and/or expanded to include all the graphic displays and monitoring systems for the buildings in this contract. Note: An existing Johnson Con-trols Metasys DDC System is currently utilized for base EMCS functions. Any system proposed other than Metasys shall be required to fully interface with and integrate with the Metasys system via a "gateway" or other protocol-conversion device. By performing an integration of the two systems, it is mandatory that all functionality remain intact so that the systems can coex-ist on the same network. The Contractor shall demonstrate the proposed sys-tem's compatibility with the existing UMCS system within 45 days of the re-ceipt of the notice-to-proceed and/or prior to submissions.

2.20.9.1 General Description

The personal computer (desktop) shall be gen-eral purpose and commercially available, with sufficient memory and processor capacity to perform all functions described in this specification.

2.20.9.2 Capabilities

Personnel computer workstations shall be provided for command entry, information management, network alarm management, and data base management functions.

2.20.9.3 Data Base Save/Restore/Back-Up

Back-up copies of all digital panel data shall be stored in the personal computer. The network/data base shall also be stored on a rewritable CD-ROM or magnetic tape.

2.20.9.4 Features

Central workstation shall include the following features as a minimum:

Microsoft Windows NT (latest version) software.

Pentium III or IV microprocessor running at 1.0GHz.

128MB 133MHz SDRAM.

20GB hard drive.

17 inch, 1024 by 768 Resolution (.26 Dot Pitch), SVGA color monitor.

16MB graphics card.

1.44MB, 3.5 inch diskette drive.

8x/4x/32x CD-RW drive.

64V PCI sound card and speakers.

V.90/56K PCI data/fax modem.

Network interface card.

101 key standard keyboard.

3-button wheel mouse.

Laser jet printer, 600 by 600 dpi, 8 ppm.

2.21 PNEUMATIC POWER SUPPLY AND PIPING

2.21.1 Air Compressor

Provide tank-mounted, electric motor-driven, air-cooled, oil-less, reciprocating type air compressor including motor, control-ler, pressure switch, belt guard, pressure reducing valve, pressure relief valve, automatic moisture drain valve, air intake filter, and silencer. Pis-ton speed shall not exceed 40 fpm. Set relief valve for 10 psig above the control switch cut-off pressure. Pressure switches shall start compressor at 70 psig and stop compressor at 90 psig. Size each compressor to run not more than 33 percent of the time with full system control load. Provide duplex air compressors with electric alternator switch and electrical duplex con-troller for systems having more than 50 control devices.

2.21.2 Compressed Air Tank

Provide zinc-coated steel tank constructed in accordance with the ASME BPVC, Sec VIII, Div 1, for not less than 125 psig working pressure with 20 gallons minimum capacity; size tank such that idle time between compressor running periods shall be not less than 6 minutes with full system control load.

2.21.3 Intake Air Filter and Silencer

Provide dry-type combination intake air filter and silencer with baked enamel steel housing. Filter shall be 99 percent efficient at 10 micron rating and provide residential class intake air silencer.

2.21.4 Refrigerated Air Dryer

Size dryer to reduce the compressed air dew- point temperature to 0 degrees F. Provide devices for automatic draining of condensed water and oil.

2.21.5 Compressed Air Filter

Provide dry type filter, 99 percent efficient in removing oil and solid particles at 0.03 micron rating, with baked enamel steel housing and manual drain valve.

2.21.6 Pressure Reducing Station

Providing pressure reducing valve (PRV) with field adjustable range of zero to 50 psig discharge pressure, with inlet pressure of 70 to 90 psig. Provide factory set pressure relief valve to re-live overpressure downstream of PRV exceeding 25 psig. Provide inlet pres-sure gage with range of zero to 100 psig, and outlet pressure gage with range of zero to 30 psig.

2.21.7 Pneumatic Piping

Run concealed where possible in finished areas, and run exposed in unfinished areas such as mechanical equipment rooms and shop areas. Run piping to be enclosed in concrete, in rigid metal or inter-mediate metal conduit. Provide piping in a neat and workmanlike manner throughout and free of leaks. Maximum spacing between piping supports shall be 5 feet. Test each piping system pneumatically at 1.5 times the working pressure for 24 hours, with a maximum pressure drop of 1 psig. Correct joint leaks by remaking of the joint; calking of joints will not be permitted. Piping shall be copper, polybutylene, or polyethylene tubing as specified herein. Piping and two insulated copper phone wires for installation check-out may be run in the same conduit; piping and electrical power conductors shall not be run in the same conduit; however, control circuit conductors may be run in the same conduit as polybutylene or polyethylene tubing. Exposed piping shall be copper tubing.

2.21.7.1 Copper Tubing

Copper tubing shall conform to ASTM B75 or ASTM B88. Tubing 0.375 inch outside diameter and larger shall have minimum wall thickness equal to ASTM B88, Type M. Tubing less than 0.375 inch outside di-ameter shall have minimum wall thickness of 0.025 inch. Concealed piping shall be hard or soft copper tubing; multiple piping shall be racked or bun-dled. Exposed piping shall be hard copper tubing; rack multiple piping. Fittings shall be solder type and conform to ANSI B16.18 or ANSI B.16.22, when using ASTM B32, or compression type conforming to ANSI B16.26.

2.21.7.2 Polybutylene and Polyethylene Tubing

Piping shall be multiple polybutylene or polyethylene tubing in extruded polyvinyl chloride (PVC) pro-tective sheath, or unsheathed polybutylene or polyethylene tubing in rigid metal, intermediate metal or electrical metallic tubing conduit. Single un-sheathed polybutylene or polyethylene tubing may be used within control pan-els only. Number each tube. Fittings shall be compression or barbed push-on type. Polybutylene plastic tubing shall conform to ASTM D2666. Polyethylene plastic tubing shall conform to ASTM D2737. Plastic tubing shall have the burning characteristics of linear low-density polyethylene tubing, shall be self-extinguishing when tested in accordance with ASTM D635, shall have UL 94 V-2 flammability classification, and shall withstand stress cracking when tested in accordance with ASTM D1693. Plastic-tubing bundles shall be pro-vided with Mylar barrier and flame-retardant polyethylene jacket.

2.21.7.3 Stainless Steel

Stainless steel tubing shall conform to ASTM A269 and shall have stainless steel compression fittings.

PART 3 EXECUTION

3.1 GENERAL

Install direct digital HVAC control systems as indicated on the plans and specified herein.

3.2 INSTALLATION

3.2.1 HVAC Control System

The HVAC control system shall be completely in-stalled and ready for

operation. Dielectric isolation shall be provided where dissimilar metals are used for connection and support. Penetrations through and mounting holes in the building exterior shall be made watertight. The HVAC control system installation shall provide clearance for control sys-tem maintenance by maintaining access space between coils, access space to mixed-air plenums, and other access space required to calibrate, remove, re-pair, or replace control system devices. The control system installation shall not interfere with the clearance requirements for mechanical and elec-trical system maintenance.

3.2.2 Software Installation

Software shall be loaded for an operational system, including databases for all points, operational parameters, and sys-tem, command, and application software. The Contractor shall provide origi-nal and backup copies of source, excluding the general purpose operating sys-tems and utility programs furnished by computer manufacturers and the non-job-specific proprietary code furnished by the system manufacturer, and ob-ject modules for all software on each type of media utilized, within 30 days of formal Government acceptance. In addition, a copy of individual floppy disks of all software for each DDC panel shall be provided.

3.2.3 Device-Mounting Criteria

Devices mounted in or on piping or duct-work, on building surfaces, in mechanical/electrical spaces, or in occupied space ceilings shall be installed in accordance with manufacturer's recommen-dations and as shown. Control devices to be installed in piping and ductwork shall be provided with all required gaskets, flanges, thermal compounds, in-sulation, piping, fittings, and manual valves for shutoff, equalization, purging, and calibration. Strap-on temperature sensing elements shall not be used except as specified.

3.2.4 Wiring Criteria

Wiring external to control panels, including low-voltage wiring, shall be installed in metallic or PVC raceways (NO EXCEP-TIONS). Wiring shall be installed without splices between control devices and DDC panels. Instrumentation grounding shall be installed as necessary to prevent ground loops, noise, and surges from adversely affecting operation of the system. Cables and conductor wires shall be tagged at both ends, with the identifier shown on the shop drawings, in accordance with the require-ments of SECTION 16050, ELECTRICAL.

3.3 CONTROL-SYSTEM INSTALLATION

3.3.1 Damper Actuators

Actuators shall not be mounted in the air stream. Multiple actuators operating a common damper shall be connected to a common drive shaft. Actuators shall be installed so that their action shall seal the damper to the extent required to maintain leakage at or below the speci-fied rate and shall move the blades smoothly.

3.3.2 Room-Instrument Mounting

Room instruments shall be mounted so that their sensing elements are 5 feet above the finished floor unless otherwise shown. Temperature setpoint device shall be recess mounted.

3.3.3 Freezestats

For each 20 square feet of coil-face area, or fraction thereof, a freezestat shall be provided to sense the temperature at the loca-tion shown. Manual reset freezestats shall be installed in approved, acces-sible locations where they can be reset easily. The freezestat sensing ele-ment shall be installed in a serpentine pattern.

3.3.4 Averaging-Temperature Sensing Elements

Sensing elements shall have a total element minimum length equal to 1 linear foot per square foot of duct cross-sectional area.

3.3.5 Duct Static-Pressure Sensing Elements and Transmitters

The duct static-pressure sensing element and transmitter sensing point shall be lo-cated approximately two-thirds of the distance from the supply fan to the end of the duct with the greatest pressure drop.

3.4 CONTROL SEQUENCES OF OPERATION

3.4.1 General Requirements - HVAC System

These requirements shall apply to all primary HVAC systems unless modified herein. The sequences describe the actions of the control system for one direction of change in the HVAC process analog variable, such as temperature or pressure. The reverse sequence shall occur when the direction of change is reversed.

3.4.1.1 Supply Fan Operating

HVAC system outside air and return air dampers shall function as described for specific modes of operation. Cooling-coil control valves and cooling-coil circulating pumps shall function as described for the specific modes of operation unless their control is assumed by the freeze-protection system. Heating coil valves shall be under control.

3.4.1.2 Supply Fan Not Operating

When an HVAC system is stopped, the outside air dampers shall close, the return air damper shall open, and all cooling-coil valves for coils located indoors shall close to the coil. Heating-coil valves shall remain under control.

3.4.2 Unit Heater and Cabinet Unit Heater

All Modes - A wall-mounted thermostat with an "AUTO-OFF" switch located as shown, shall cycle the fan to maintain its setpoint (68 degree F. adjustable) when the switch is in the "AUTO" position. When the switch is in the "OFF" position, the fan shall be stopped.

3.4.3 Single Building Hydronic Heating with Hot Water Boiler

The DDC system shall accept a signal from a sunshielded outside-air temperature sensing element and transmitter to measure outside air temperature. The DDC system shall accept a signal from a temperature sensing element and transmitter located in the hydronic-heating supply line to measure hot water supply temperature.

3.4.3.1 Boiler Module Control, Heat Mode Off:

When the outdoor temperature is above 65 degrees F, the heat mode contact in the boiler direct digital control panel shall be open, the system supply pump shall be off, no boilers shall fire and each boiler recirculation pump shall be off.

3.4.3.2 Boiler Module Control, Heat Mode On:

When the outdoor temperature falls below 65 degrees F, the boiler direct digital control (DDC) panel shall close a contact which shall energize the hot water system lead pump, enabling the panel to sequence boiler circulation pumps and fire boilers. Flow shall be proven in the hydronic-heating system supply main prior to sequencing of the boilers. Once flow is proven, the DDC system shall energize individual boiler circulation pumps and than fire its corresponding boiler in sequence to maintain the hydronic-heating supply temperature setpoint in the hydronic-heating supply line, in accordance with the linear hot water reset schedule as follows:

TABLE I. HOT WATER RESET SCHEDULE

Outside Air Temperature	Hot Water Supply Temperature	
0 degrees F. 60 degrees F.	150 degrees F. (adjustable) 85 degrees F. (adjustable)	

3.4.3.3 Primary/Back-up Pump Control

When the DDC system places the system in the heating mode, the primary pump shall start and run continuously. Whenever the cumulative run-time of the primary pump exceeds the cumulative run-time of the back-up pump by 168 hours, the primary and back-up pumps shall alternate function, with the primary pump becoming the back-up pump, and the back-up pump becoming the primary pump. During switchover, a time delay of 30 seconds shall be provided between stopping and starting of the pumps.

3.4.4 Single Building Hydronic Cooling with Water Chiller and Fluid Coolers

3.4.4.1 Chilled Water Pump

Chilled water pump start/stop and chiller enable/disable is issued by the DDC system based on scheduled occupancy. The chilled water system shall also be optimally started based on outside air temperature and space temperature.

3.4.4.2 Package Chiller

Package chiller internal control shall be by chiller manufacturer. DDC shall enable/disable chiller by interrupting flow switch circuit. Maintain chilled water pump operation for 5 minutes (adj.) upon chiller disable.

3.4.4.3 Chiller Module Control, Chiller Mode Off:

When the outdoor temperature is below the setpoint shown by the designer (minimum 40 degrees F), the cooling mode contact in the chiller direct

digital control panel shall be open and the chillers shall be off.

3.4.4.4 Chiller Module Control, Chiller Mode On:

When the outdoor temperature rises above the setpoint shown by the designer (minimum 40 degrees F), the chiller DDC panel shall accept a signal from a chilled water supply temperature sensing element located in the hydronic?cooling supply line, and shall operate the chiller to maintain the chilled water system supply setpoint temperature as shown by the designer.

3.4.4.5 Fluid Cooler Module Control, Fluid Cooler Mode Off:

When the outdoor temperature is above the setpoint shown by the designer (maximum 60 degrees F), the DDC panel shall de-energize a two position three way control valve to bypass flow around the fluid cooler.

3.4.4.6 Fluid Cooler Module Control, Fluid Cooler Mode On:

When the outdoor temperature falls below the setpoint shown by the designer (maximum 60 degrees F), the DDC panel shall energize a two position three way control valve to provide flow through the fluid cooler and shall enable the fluid cooler to maintain the chilled water system supply setpoint temperature as shown by the designer.

3.4.4.7 Dual Operation:

When the outdoor temperature is between the setpoints shown by the designer (minimum 40 degrees F and maximum 60 degrees F), the cooling capacity shall be provided by the fluid cooler up to the maximum amount possible and than by the chiller as required to meet the cooling load.

3.4.4.8 Chilled Water Temperature Reset

Chilled water temperature reset shall be as follows:

TABLE II. CHILLED WATER RESET SCHEDULE

Outside Air Temperature	Chilled Water Supply Temperature
75 degrees F.	Summer Design Setpoint.
40 degrees F.	Winter Design Setpoin.

3.4.5 Three Deck Multizone without Return Fan

3.4.5.1 Occupied, Unoccupied, and Ventilation-Delay Modes of Operation

Ventilation-delay mode timing shall start prior to the occupied-mode timing. The DDC system shall prevent the outside air damper from opening. The DDC system shall place the system in the occupied mode in accordance with the building operating schedule. At the expiration of the ventilation-delay mode timing period, the DDC system shall allow the outside air damper to open. The DDC system shall place the control system in the unoccupied mode of operation in accordance with the building operating schedule.

3.4.5.2 Outside Air and Return Air Dampers

Occupied Mode - The outside air, return air, and relief air dampers shall be under mixed air control.

Unoccupied Mode - The dampers shall return to their normal positions as shown, (outside air and relief air NC, return air NO).

Ventilation-Delay Mode - The dampers shall return to their normal positions as shown, (outside air and relief air NC, return air NO).

3.4.5.3 Supply-Fan Control

Occupied and Ventilation-Delay Modes - Supply fan shall start, and operate continuously.

Unoccupied Mode - The supply fan shall cycle to maintain zone unoccupied set-back schedule. The fan shall start and stop at the setpoints as shown.

Unoccupied Setback Schedule

TABLE III. UNOCCUPIED SETBACK SCHEDULE

Season Mode	Setpoint Temperature	
Winter Heating	65 degrees F	
Summer Cooling	85 degrees F	

3.4.5.4 Filter

A differential pressure switch across the filter shall initiate a filter alarm when the pressure drop across the filter reaches the setpoint as shown (0.5 inch WC, adj.).

3.4.5.5 Freeze Protection

All Modes - A freezestat, located as shown, shall stop the supply fan, cause the outside air and return air dampers to return to their normal position, and shall initiate a low temperature alarm if the temperature drops below the freezestat's setpoint (37 degree F. adjustable). Return to the normal mode of operation shall require manual reset at the freezestat. The DDC panel shall monitor the freezestat through auxiliary contacts and shall indicate an alarm condition when the freezestat trips.

3.4.5.6 Heating Coil

All Modes - There shall not be any control valve on the heating coil.

3.4.5.7 Cooling Coil

All Modes - There shall not be any control valve on the cooling coil.

3.4.5.8 Mixed Air Temperature Control

Occupied Mode - The dampers shall open to their minimum outside air positions. The DDC system shall prevent the outside air damper from opening prior to the occupied-mode.

Unoccupied Mode - The dampers shall return to their normal positions to recirculate 100 % return air. The DDC system shall prevent the outside air damper from opening prior to the occupied-mode.

3.4.5.9 Precooling Coil

Occupied Mode - The control valve shall be modulated by the DDC system from the signal of an averaging type temperature sensing element and transmitter located in the coil discharge air to maintain the setpoint of 60 degrees F.

Unoccupied and Ventilation-Delay Modes - The DDC system shall close the precooling coil control valve.

3.4.5.10 Zone Control

All Modes - A space temperature sensor for each zone shall signal the DDC system to gradually operate the zone mixing dampers to heat and cool its respective zone by mixing cold-deck air and bypass-deck air to maintain the cooling setpoint of 78 degrees F (occupied only) or hot-deck air and bypass-deck air to maintain the heating setpoint of 68 degrees F occupied or 60 degrees F unoccupied. On a rise in space temperature, the hot-deck damper shall gradually close, and the hot-deck's bypass damper shall gradually open while the cold-deck damper shall remain closed, and the cold-deck's bypass damper shall remain open. While passing through a dead band, both the hot-deck damper and cold-deck damper shall remain closed, and both the hot-deck's bypass damper and the cold-deck's bypass damper shall remain open. After passing through a dead band, on a continued rise in space temperature, the cold-deck damper shall gradually open, and the cold-deck's bypass damper shall gradually close while the hot-deck damper shall remain open.

3.4.5.11 Emergency Fan Shutdown

All Modes - Smoke detectors in the supply air ductwork or air handling unit and return air ductwork as shown by the designer shall stop the supply fan and initiate a smoke alarm if smoke is detected at either location.

Restarting the supply fan shall require manual reset at the smoke detectors.

3.4.6 Blower Coil Unit Control with Exhaust Fan and Limited Humidity Control

3.4.6.1 Occupied, Unoccupied, and Ventilation-Delay Modes of Operation

The DDC system shall perform time-clock functions to the following modes of operation: Occupied, Unoccupied, and Ventilation-Delay Modes of Operation. The Ventilation-Delay mode timing shall start prior to the occupied mode timing. When operating in the ventilation-delay mode, the DDC system shall prevent the Blower Coil Unit from operating. At the time shown, the DDC system shall place the system in the occupied mode. At the expiration of the ventilation-delay mode, the Blower Coil Unit shall be activated. At the time shown, the DDC system shall place the system in the unoccupied mode of operation.

3.4.6.2 Outside-Air and Relief-Air Dampers

Occupied Mode - The outside-air and relief-air dampers shall be open.

Ventilation-Delay and Unoccupied Mode - The dampers shall return to their normal positions as shown.

3.4.6.3 Supply Fan Control

Occupied Mode - The supply fan shall start and shall operate continuously.

Unoccupied and Ventilation-Delay Modes - The supply fan shall not operate.

3.4.6.4 Filter

A differential pressure switch across the filter shall initiate a filter alarm when the pressure drop across the filter reaches the setpoint as shown (0.5 inch WC, adj.).

3.4.6.5 Freeze Protection

All Modes - A freezestat, located as shown, shall stop the supply fan, cause the outside air and return air dampers to return to their normal position, and shall initiate a low temperature alarm if the temperature drops below the freezestat's setpoint (37 degree F. adjustable). Return to the normal mode of operation shall require manual reset at the freezestat. The DDC panel shall monitor the freezestat through auxiliary contacts and shall indicate an alarm condition when the freezestat trips.

3.4.6.6 Cooling Coil

Occupied Mode - The control valve shall be modulated by the DDC system from the signal of an averaging type temperature sensing element and transmitter located in the coil discharge air to maintain the setpoint of 60 degrees F.

Unoccupied and Ventilation-Delay Modes - The DDC system shall close the precooling coil control valve.

3.4.6.7 Preheat Coil

Occupied Mode - The control valve shall be modulated by the DDC system from the signal of an averaging type temperature sensing element and transmitter located in the coil discharge air to maintain the setpoint of 68 degrees F.

Unoccupied and Ventilation-Delay Modes - The DDC system shall close the precooling coil control valve.

3.5 COMMISSIONING PROCEDURES

3.5.1 Evaluations

The Contractor shall make the observations, adjustments, calibrations, measurements, and tests of the control systems, set the time schedule, and make any necessary control-system corrections to ensure that the systems function as described in the sequence of operation.

3.5.1.1 Item Check

Signal levels shall be recorded for the extreme posi-tions of each controlled device. An item-by-item check of the sequence of operation requirement shall be performed using Steps 1 through 4 in the specified control system commissioning procedures. Steps 1, 2, and 3 shall be performed with the HVAC system shut down; Step 4 shall be performed after the HVAC systems have been started. External input signals to the DDC panel (such as starter auxiliary contacts, and external systems) may be simulated in steps 1, 2, and 3. With each operational-mode signal change,

DDC panel output relay contacts shall be observed to ensure that they function.

3.5.1.2 Weather-Dependent Test Procedures

Weather-dependent test proce-dures that cannot be performed by simulation shall be performed in the appro-priate climatic season. When simulation is used, the actual results shall be verified in the appropriate season.

3.5.1.3 Two-Point Accuracy Check

A two-point accuracy check of the cali-bration of each HVAC control system sensing element and transmitter shall be performed by comparing the DDC panel readout to the actual value of the vari-able measured at the sensing element and transmitter or airflow measurement station location. Digital indicating test instruments shall be used, such as digital thermometers, motor-driven psychrometers, and tachometers. The test instruments shall be at least twice as accurate as the specified sensing ele-ment-to-DDC panel readout accuracy. The calibration of the test instruments shall be traceable to National Institute Of Standards And Technology stan-dards. The first check point shall be with the HVAC system in the shutdown condition, and the second check point shall be with the HVAC system in an op-erational condition. Calibration checks shall verify that the sensing ele-ment-to-DDC panel readout accuracies at two points are within the specified product accuracy tolerances. If not, the device shall be recalibrated or re-placed and the calibration check repeated.

3.5.1.4 Insertion and Immersion Temperatures

Insertion temperature and im-mersion temperature sensing elements and transmitter-to-DDC panel readout calibration accuracy shall be checked at one physical location along the axis of the sensing element.

3.5.1.5 Averaging Temperature

Averaging-temperature sensing element and transmitter-to-DDC panel readout calibration accuracy shall be checked every 2 feet along the axis of the sensing element in the proximity of the sensing element, for a maximum of 10 readings. These readings shall then be aver-aged.

3.5.2 Unit Heater and Cabinet Unit Heater

The "OFF/AUTO" switch shall be placed in the "OFF" position. Each space-thermostat temperature setting shall be turned up so that it makes contact and turns on the unit heater fans. The unit heater fans shall not start. The "OFF/AUTO" switch shall be placed in the "AUTO" position. It shall be ensured that the unit-heater fans start. Each space thermostat temperature setting shall be turned down, and the unit-heater fans shall stop. The thermostats shall be set at their tem-perature setpoints. The results of testing of one of each type of unit shall be logged.

3.5.3 Single Building Hydronic Heating with Hot Water Boiler

Steps for installation shall be as follows:

3.5.3.1 Step 1 - System Inspection

The HVAC system shall be observed in its shutdown condition. It shall be verified that power and main air are available where required.

3.5.3.2 Step 2 - Calibration Accuracy Check with HVAC System Shutdown

Readings shall be taken with a digital thermometer at each temperature-sensing element location. Each temperature shall be read at the DDC panel, and the thermometer and DDC panel readings logged. The calibration accuracy of the sensing element-to-DDC panel readout for outside air temperature and system supply temperature shall be checked.

3.5.3.3 Step 3 - Control-System Commissioning

The two-point calibration sensing element-to-DDC panel readout accuracy check for the outside air temperature shall be performed. Any necessary software adjustments to setpoints or parameters shall be made to achieve the outside air temperature schedule.

The outside air temperature shall be simulated through an operator entered value to be above the setpoint. It shall be verified that pumps and boiler stop. A value shall be entered to simulate that the outside air temperature is below the setpoint as shown. It shall be verified that hot water system pump starts and that each boiler recirculation pump starts in sequence as required. It shall be verified that each boiler fires when its respective boiler recirculation pump starts.

The two-point calibration accuracy check of the sensing element-to-DDC panel readout for the system-supply temperature shall be performed. The system-supply temperature setpoint shall be set for the temperature schedule as shown. Signals shall be sent to the DDC panel from the outside air temperature sensor, to verify that the system-supply temperature setpoint changes to the appropriate values.

3.5.4 Building Hydronic Cooling with Air Cooled Rotary Chiller and Fluid Coolers

Steps for installation shall be as follows:

3.5.4.1 Step 1 - System Inspection

The HVAC system shall be observed in its shutdown condition. It shall be verified that power and main air are available where required.

3.5.4.2 Step 2 - Calibration Accuracy Check with HVAC System Shutdown

Readings shall be taken with a digital thermometer at each temperature-sensing element location. Each temperature shall be read at the DDC panel, and the thermometer and DDC panel readings logged. The calibration accuracy of the sensing element-to-DDC panel readout for outside air temperature and system supply temperature shall be checked.

3.5.4.3 Step 3 - Control-System Commissioning

The two-point calibration sensing element-to-DDC panel readout accuracy check for the outside air temperature shall be performed. Any necessary software adjustments to setpoints or parameters shall be made to achieve the outside air temperature schedule.

The space temperature shall be simulated through an operator

entered value to be below the setpoint. It shall be verified that the chilled water system pump, the chiller and each fluid cooler are stopped. A value shall be entered to simulate that the outside air temperature is above the setpoint as shown (maximum 40 degrees F). It shall be verified that chilled water system pump starts and that each fluid cooler starts as required. A value shall be entered to simulate that the outside air temperature is above the setpoint as shown (minimum 40 degrees F). It shall be verified that chiller starts. A value shall be entered to simulate that the outside air temperature is above the setpoint as shown (maximum 60 degrees F). It shall be verified that each fluid cooler stops as required.

The two-point calibration accuracy check of the sensing element-to-DDC panel readout for the system-supply temperature shall be performed. The system-supply temperature setpoint shall be set for the temperature schedule as shown. Signals shall be sent to the DDC panel from the outside air temperature sensor, to verify that the system-supply temperature setpoint changes to the appropriate values.

3.5.5 Three Deck Multizone Control System with Precool Coil

Steps for installation shall be as follows:

3.5.5.1 Step 1 - System Inspection

The HVAC system shall be observed in its shutdown condition. The system shall be checked to see that power is available where required, the outside air dampers and relief air dampers are closed, the return air damper is open, and the cooling coil valve is closed.

3.5.5.2 Step 2 - Calibration Accuracy Check with HVAC System in Shutdown

Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC panel, and the thermometer and DDC panel display readings logged. The calibration accuracy of the sensing element-to-DDC panel readout for outside air, return air, mixed air, the precooling-coil discharge air, the heating-coil discharge air and the cooling-coil discharge air temperatures shall be checked.

3.5.5.3 Step 3 - Actuator Range Adjustments

A signal shall be applied to the actuator through an operator entered value to the DDC panel. The proper operation of the actuators for all dampers and valves shall be visually verified. The signal shall be varied from live zero to full range, and it shall be verified that the actuators travel from zero stroke to full stroke within the signal range. It shall be verified that all sequenced and parallel-operated actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

3.5.5.4 Step 4 - Control-System Commissioning

With the fan ready to start, the system shall be placed in the ventilation-delay mode and in the occupied mode through operator entered values. It shall be verified that supply fan starts. It shall be verified that the outside air damper and relief air

dampers are closed and the return air damper is open. The system shall be placed out of the ventilation-delay mode, and it shall be verified that the outside air, relief air dampers and return air dampers open to the minimum outside air position, and the precooling coil valve is under control, by simulating a change in the coil discharge temperature.

The two-point calibration accuracy check of sensing element-to-DDC system readout for the precool coil discharge air temperature shall be performed. The setpoint for the coil discharge air temperature shall be set as shown. A change shall be simulated in the coil discharge air temperature through an operator entered value and it shall be verified that the precool coil control valve is modulated.

With supply fan running, a high static-pressure input signal shall be simulated at the device, by pressure input to the differential pressure switch sensing device. HVAC system shutdown shall be verified, it shall be verified that the high-static-pressure alarm is initiated. The differential pressure switch shall be set at the setpoint. The HVAC system shall be re-started by manual reset, and it shall be verified that the high static-pressure alarm returns to normal.

The system shall be placed in the unoccupied-mode and it shall be verified that the occupied-mode light turns off, the HVAC system shuts down, and the control system assumes the specified shutdown conditions. The space temperature shall be artificially changed to below the night setback temperature setpoint, and it shall be verified that the HVAC system starts; the space temperature shall be artificially changed to above the night setback setpoint, and it shall be verified that the HVAC system stops. The night setback temperature setpoint shall be set at the setpoint as shown.

With the HVAC system running, a filter differential pressure switch input signal shall be simulated at the device. It shall be verified that the filter alarm is initiated. The differential pressure switch shall be set at the setpoint.

With the HVAC system running, a freezestat trip input signal shall be simulated, at the device. HVAC system shutdown shall be verified. It shall be verified that a low temperature alarm is initiated. The freezestat shall be set at the setpoint. The HVAC system shall be restarted by manual restart and it shall be verified that the alarm returns to normal.

With the HVAC system running, a smoke-detector trip input signal shall be simulated at each detector, and control-device actions and interlock functions as described in the Sequence of Operation shall be verified. Simu-lation shall be performed without false alarming any Life Safety systems. It shall be verified that the HVAC system shuts down and the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and it shall be verified that the alarm returns to normal.

The temperature setpoint of each zone temperature sensor and transmitter shall be raised and it shall be verified that the zone cold-deck damper closes to the cold-deck and opens to the by

pass-deck. The temperature setpoint of each zone temperature sensor and transmitter shall be raised further and it shall be verified that the zone hot-deck damper closes to the by pass-deck and opens to the hot-deck. Each zone temperature sensor and transmitter shall be calibrated and set to provide a dead band between 68 degrees F and 78 degrees F in which the zone temperature will float and all zone supply air shall pass through the by pass-deck.

-- End of Section --

DIVISION 16 – ELECTRICAL

16000: Outline Specifications

SECTION 16000

DIVISION 16: ELECTRICAL - OUTLINE SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Guide Specifications

The contractor shall edit and provide the following UFGS guide specifications for Division 16, Electrical. All Part 3 requirements shall be included and uneditied for all equipment included in this contract.

Section 16070, SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT

Section 16375, ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND

Section 16415, ELECTRICAL WORK, INTERIOR

Section 16528, EXTERIOR LIGHTING

Section 16710, PREMISE DISTRIBUTION SYSTEM

Section 16711, TELEPHONE SYSTEM OUTSIDE PLANT

Section 16713, FIBER OPTIC CABLE OUTSIDE PLANT

Section 16770, RADIO AND PUBLIC ADDRESS SYSTEMS

1.2 SECTION 16070, SEISMIC BRACING FOR ELECTRICAL EQUIPMENT

1.2.1 Material Criteria

This section should be editted to conform to the seismic requirements for this area.

1.3 SECTION 16375, ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND

1.3.1 General Requirements

- A. Pad mounted transformer shall be delta/wye, dead front, loop feed, surge arresters, with oil immersed current limiting fuses with load break switch.
- B. Primary cable shall be shielded, 15KV with 133% insulation. Cable insulation shall be EPR with minimum conductor size #2. Neutral cable shall be 600 volts.
- C. All primary connections shall be load break type.
- D. Ducts shall be 2-103mm concrete encased type EB ducts.

- E. All cabinets shall be provided with padlock hasp.
- 1.4 SECTION 16415, ELECTRICAL WORK, INTERIOR
- 1.4.1 General Requirements
 - A. All conductors shall be copper.
 - B. Conduits shall be EMT in concealed areas.
 - C. All interior branch circuit wiring shall be THHN/THWN.
 - D. Light Fixtures shall meet requirements of COE light fixture details identified in Section 01017.
 - E. All bus in panelboards shall be copper.
 - F. Transient voltage surge suppression be incorporated into the main panel and shall meet the requirements of IEEE C62.41 and be UL listed in accordance with the testing requirements of UL1449.
 - G. All step down transformers shall be compliant with NEMA TP-1.
- 1.5 SECTION 16528, EXTERIOR LIGHTING
- 1.5.1 General Requirements
 - A. All exterior lighting shall meet the requirements of COE light fixture details identified in Section 01017.
- 1.6 SECTION 16710, PREMISE DISTRIBUTION SYSTEM
- 1.6.1 General Requirements
 - A. Cable tray shall be basket type.
 - B. Cables shall be plenum rated where required.
 - C. Contractor shall have a minimum of 3 years experience in the application, installation and testing of the specified systems and equipment.
 - D. All supervisors and installers assigned to the installation of this system or any of its components shall have factory certification from each equipment manufacturer that they are qualified to install and test the provided products.
 - E. All installers assigned to the installation of this system or any of its components shall have a minimum of 3 years experience in the installation of the specified copper and fiber optic cable and components.
 - F. Electrical boxes for telecommunication outlets shall be 117 mm square by 53 mm deep with minimum 9 mm deep single or two gang plaster

ring as shown. Provide a minimum 27 mm conduit.

- 1.7 SECTION 16711, TELEPHONE SYSTEM, OUTSIDE PLANT
- 1.7.1 General Requirements
 - A. Cable shall be sized as indicated in Section 01017.
 - B. Coil 3 meters of cable in each handhole for future splicing.
- 1.8 SECTION 16713, FIBER OPTIC SYSTEM OUTSIDE PLANT
- 1.8.1 General Requirements
 - A. Single mode fiber optic cable shall be suitable for installation by direct burial or in conduit.
 - B. Coil 3 meters of cable in each handhole for future splicing.
 - C. Single mode fiber shall be loose tube fiber with 6 fibers per tube.
- 1.9 SECTION 16770, RADIO AND PUBLIC ADDRESS SYSTEMS
- 1.9.1 General Requirements
 - A. No special requirements other than those indicated in Section 01017.
 - -- End of Section --

APPENDIX A

SUBSURFACE INVESTIGATION REPORT

CENWK-EC-GL

MEMORANDUM FOR PM-MM (ATTN: Clifton Rope)

SUBJECT: Subsurface Investigation Report, Child Development Center, Ft. Riley, KS

- 1. Transmitted with this memo is the revised Subsurface Investigation Report for the referenced project.
- Minor editorial modifications were made to the original text of the subject report to render it more suitable for direct inclusion into the Request for Proposal (RFP) for this project. Changes were not made to the computations, conclusions, or recommendations presented in the original text.
- 3. Please address any questions regarding the editorial modifications to Jim McBane, (816) 983-3263.

Francke C. Walberg

Chief, Geotechnical Branch

Walberg EC-G

> Mathews EC-GL

McBane EC-GL



FORT RILEY

CHILD DEVELOPMENT CENTER SUBSURFACE INVESTIGATION REPORT

October 2001

Submitted by the US Army Corps of Engineers, Kansas City District Local Protection Section, EC-GL

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FIGURE 1: SITE LOCATION PLAN FIGURE 2: BORING LOCATION PLAN

APPENDIX A: BORING LOGS

APPENDIX B: LABORATORY TEST RESULTS

APPENDIX C: CALCULATIONS

SUBSURFACE INVESTIGATION REPORT

Child Development Center

Fort Riley, Kansas October 2001

1 INTRODUCTION

This report presents the results, observations, and recommendations for design based upon the subsurface investigation program that was conducted for the Ft. Riley Child Development Center by the Kansas City District Army Corps of Engineers between September 4 through 6, 2001. Presented in this report are requirements for the site preparation, types of allowable foundations, foundation design parameters, and pavement subgrade preparation requirements.

2 PROJECT DESCRIPTION

The project entvails construction of a Child Development Center (CDC). The proposed location of the CDC is immediately west of Building 5800, the Youth Services Center, at the northwest intersection of Thomas Avenue and Longstreet Drive. The proposed CDC will be a single story, slab-on-grade structure. It is estimated that the CDC will be approximately 23,000 to 25,000 square feet. A covered walkway will be constructed extending from the proposed CDC to the existing Youth Services Center. A playground with a synthetic, rubber surface will also be constructed adjacent to the CDC. The project will also involve the construction of parking areas and a new entrance drive. The proposed site location plan is shown in Figure 1. At the time this report was written the site layout, building dimensions, floor slab elevation, and grading plan were not finalized.

3 REGIONAL GEOLOGY

Physiographically, Fort Riley is located within the Flint Hills of the Osage Plains region of the Central Lowland province. The Flint Hills are characterized by elongated flattopped ridges generally capped by an interbedded sequence of limestones and shales. Rock strata dips gently along the backs of limestone ridges and steeper scarp slopes. The Flint Hills cross the state of Kansas in a north-south direction from Marshall County in the north to Cowley County in the south. Maximum relief is approximately 107 meters. Spacing and height of the hills are geologically determined by the vertical distance between resistant layers strong enough to maintain benches or plateaus and by the inclination of the beds. Within this region, the Cresswell and Fort Riley limestones are the bench forming limestone formations. This highland area is bisected from west to east by the Kansas River and its tributaries and by the Republican and Smokey Hill Rivers which converge at Fort Riley to form the Kansas River. Within the river floodplain, terrace deposits have developed near the valley walls and coarse river alluvium covers the majority of the floodplain area. A thin blanket of silt and clay material, 0 to 5 meters in thickness, covers the coarser river alluvium which typically consists of sand and/or

gravel lenses. The total thickness of the alluvium within the floodplain varies from 0 to 12 meters.

4 SEISMIC CONDITIONS

In reference to data published by the US Army Corps of Engineers TI 809-04, SEISMIC DESIGN FOR BUILDINGS, dated December 1998, the proposed project shall be designed using a Site Class of "D," a short period spectral acceleration coefficient (S_s) of 0.20, and a one-second period spectral acceleration coefficient (S_s) of 0.06.

5 SITE DESCRIPTION

The proposed location for the CDC is immediately west of Building 5800, the Youth Services Center, at the northwest comer of the intersection of Thomas Avenue and Longstreet Drive.

6 SUBSURFACE INVESTIGATION

The subsurface investigation for the CDC was conducted from September 4-6, 2001. The investigation consisted of seven borings, ADU-01-40 through D-01-46. Borings AD-0140 through ADU-01-43 were drilled in areas beneath the proposed footprint of the building and borings D-01-44 through D-01-46 were drilled within the proposed parking and drive areas. Figure 2 shows the boring locations. Boring logs are included in Appendix A. Borings were drilled by the Kansas City District, U.S. Army Corps of Engineers. Borings were advanced using 3-3/4 inch I.D. hollow-stem augers to the target depth or to auger refusal, whichever first occurred.

In-situ Standard Penetration Tests (SPTs) were performed in accordance with ASTM D1586 at predetermined depths. The number of blows required to drive the split spoon sampler each of three 6-inch increments of the total 1-1/2 foot drive length using a standard 140 lb. hammer are recorded on the boring logs. SPT refusal occurs when an SPT blow count of 50 is reached in less than 6-inches of driving. The SPT Number (N) is the sum of the second and third incremental SPT drive counts. Disturbed samples of subsurface materials were obtained using a 1-3/8 inch diameter standard penetration splitspoon sampler.

Undisturbed samples were collected in accordance with ASTM D-1587 using a 5-inch diameter thin walled, fixed piston (Shelby) sampling tube. Torvane tests were performed at the top, bottom and midpoint of each 2-foot Shelby sample. Jar samples were obtained of representative materials encountered from SPT tests and of samples obtained from the Shelby tube. Samples of the material recovered with the Shelby tube sampler were extruded in the field, double wrapped in aluminum foil, and sealed with wax within cardboard tubes. Maxim Technologies and the Corps of Engineers Kansas City District Geotechnical Branch tested selected soil samples. Laboratory test results are included on the boring logs in Appendix A and in Appendix B. The depth to groundwater was measured when first encountered during drilling and after leaving the borings open

overnight if water was encountered. The borings were backfilled with cement bentonite grout and/or auger cuttings prior to leaving the site.

7 SUBSURFACE CONDITIONS

Boring logs indicate a subsurface profile consisting of residual soils (residuum) overlying weathered limestone. The residual soils are composed primarily of high and low plastic clays having a stiff to very stiff consistency.

Borings ADU-01-40 through ADU-01-43 were drilled at the approximate comers of the proposed CDC. The borings encountered high and low plastic clay from the ground surface to depths of 2.3 to 4.4 meters where limestone was encountered. The natural water content of the residuum ranges from 14 to 27 percent and the dry unit weight ranges from 91 to 105 pounds per cubic foot (pcf). The liquid limit of the residuum was measured to be within the range of 31 to 51 and the plastic limit ranged from 17 to 20. Unconfined compression tests performed on three of the undisturbed samples ranged from 3.9 to 8.1 kips per square foot (ksf). Limestone was encountered at the boring locations at depths between 2.3 to 4.4 meters below ground surface and auger refusal was encountered at depths of 2.6 to 5 meters below ground surface.

Borings D-01-44 through D-01-46 were drilled in the proposed parking and drive areas. The borings encountered high plastic residual soil from the ground surface to a depth of 0.3 to 0.6 meters where weathered shale and limestone was encountered. The natural water content of two samples of the high plastic clay was measured at 16 and 18 percent. The liquid and plastic limit of one sample of the high plastic clay was 57 and 23, respectively. Auger refusal was encountered at the boring locations at depths of 0.8 to 1.2 meters below the existing ground surface.

Groundwater was not detected at the time of drilling at any of the boring locations.

8 LABORATORY TESTING

Three wax samples and nine Jar samples were designated for laboratory analyses. Laboratory tests assigned to the wax samples included unconfined compression in accordance with ASTM D-2166, Atterberg limits in accordance with ASTM D-4318, visual classification in accordance with ASTM D-2487, dry unit weight in accordance with ASTM D-4718, and natural water content in accordance with ASTM D-2216. The laboratory test data is presented in Appendix B.

9 SITE PREPARATION

Site preparation shall include the removal of existing vegetation, stumps, roots, pavements, base course materials, concrete curbs and gutters, underground utilities, and other deleterious materials to at least five feet outside of the building pad limits. Any voids created by the removal of these materials shall be filled with compacted fill. All existing topsoil shall be removed and stored in a designated area until the completion of

the project. Prior to placement of the first lift of fill, native soils shall be scarified to a depth of 150 mm and compacted to the proper moisture and density. Sloped Surfaces greater than one vertical to four horizontal shall be benched or stepped prior to the placement of any new fill.

Satisfactory and unsatisfactory materials shall be classified according the Unified Soils Classification System (USCS) criteria. Satisfactory materials include the USCS classifications GW, GP, GM, GC, SW, SM, SC, ML, CL, and CH. Unsatisfactory materials include the USCS classifications SP, MH, Pt, OH, and OL. Unsatisfactory materials also include debris, refuse, roots, organic matter, frozen material, and stones larger than 75-mm in diameter. Soil-like materials obtained from the excavation, e.g. intensely weathered sedimentary rock Such as sandstone, shale, and underclay, will not be considered satisfactory for use as borrow. Borrow material for the construction of engineered fill must be obtained from an approved source off the limits of government property.

Select materials shall be used within 0.6 vertical meters of the bottom of slabs-on-grade. Select material shall consist of natural sand and gravel, crushed rock, manufactured sand or quarry fines that have a maximum particle size of 25-mm and 15 to 50 percent passing the #200 sieve. Clay with liquid limits greater than 50 shall not be used for compacted fill within 0.6 vertical meters of the bottom of slab-on-grade. The portion of the material passing the #40 sieve shall either be non-plastic or have a plasticity index equal to or less than 12. Select material shall be compacted to at least 95 percent of the maximum density based on ASTM D 1557.

Materials placed as backfill shall be placed in uncompacted lifts not to exceed 200 mm in thickness. Compaction shall be accomplished by approved equipment well suited to the material being compacted. Prior to compaction, the moisture content of the cohesive and non-cohesive materials shall be adjusted to a range of between 0 and +4 percent of optimum moisture either by moistening or aerating as required. The use of a drying agent; i.e., type-C fly ash, shall be allowed: however, use of a drying agent will be considered a means of aeration chosen by the Contractor to allow him to meet construction schedules at no additional cost to the Government.

Expansive soils with a plasticity index equal to or greater than 18 shall be compacted to a density of not less than 90 percent nor more than 93 percent of maximum density with a water content between +3 and +6 percent of optimum as determined by ASTM D-1557. Non-expansive cohesive fill shall be compacted to not less than 90 percent of the maximum density as determined by ASTM D-1557. Non-cohesive fill materials shall be compacted to not less than 95 percent of the maximum density as determined by ASTM D-1557. In-place densities of engineered fill shall be deten-nined by the Contractor using ASTM D-1556, ASTM D-2937, or ASTM D-2922 in conjunction with ASTM D-3017. If ASTM D-2922 is used for field density control, there shall be at least one test performed according to ASTM D-1556 for every 10 tests performed according to ASTM D-2922 for verification of results obtained from the latter. Field density tests of the site grading operations shall be performed at a frequency of not less than one test per every

200-mm lift for every 2000 m² of graded area. Field density tests of material placed beneath the building footprint shall be performed at a frequency of not less than one test 2 per each 200-mm lift per 2500 m² area. Wall and/or footing backfill shall be tested at a rate of one test per 200-mm lift per 12 linear meters.

Working surfaces shall be sufficiently sloped to prevent the ponding of water during construction. Excessively wet material shall either be aerated or removed from the fill area prior to the placement of any subsequent lifts. Frozen material will not be allowed in the fill. Approved compacted fill shall be maintained at the proper moisture and density condition until the slab-on-grade, foundation, or pavement is completed. Areas disturbed during construction shall be recompacted to the specified moisture and density. Fill within the building area shall be constructed to the finished grade elevation before foundations are constructed.

10 FOUNDATION RECOMMENDATIONS

Footings are to be founded on native (undisturbed) clay. Footing excavations shall not proceed until immediately prior to placement of concrete to prevent any adverse drying or accumulation of water. Excavations shall be maintained in a dry condition until footing excavations are approved and concrete placed. Foundation excavations shall be observed prior to the placement of concrete to confirm that the design bearing materials are present and that the excavation is free of soft and loose material, zones, and/or water. Footings may be constructed either as conventional wall footings or as spread footings, eliminating the need for backfilling the footing excavations. The bottom of the footings shall bear a minimum of 0.9 meters below grade to prevent possible heaving due to freeze-thaw effects.

Foundation Design Recommendations

Value	Recommendation	
Allowable Bearing Capacity	Wall Footings	142 kPa (3000 psf)
	Spread Footings	166 kPa (3500 psf)
Backfill Unit Weight	Native Clay	1922 kg/m3 (120 pcf)
	Granular Sand	1760 kg/m' (I 10 pcf)
Coefficient of Sliding for Concrete		
on Foundation Material	0.57	
Coefficient of Subgrade Reaction		
for Slab on Grade	2070 g/cm^3	

Structural loads were not available at the time of this report. Based on experience with similar structures in the area, project structures shall be designed to accommodate total and differential settlements of 25-mm and 13-mm, respectively.

A 6-mil thick vapor barrier shall directly underlie all slab-on-grade floors and overlaying a minimum of 150-mm thick, open graded, crushed rock capillary water barrier. The capillary water barrier shall be composed of material having a maximum particle size of

37.5-mm and a maximum of 2 percent passing the #4 sieve. All interior slabs-on-grade shall be isolated from load bearing walls and columns using a layer of 13.6 kg felt or equivalent. Slabs-on-grade shall be designed using, a coefficient of subgrade reaction of 2070 grams/cubic centimeter.

Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of the backfill above the back of the wall or wall footings. Excavations for utility trenches can be made vertically in an unsupported condition to a maximum depth of 1.2 meters measured from the top of the trench. Excavation made below a depth of 1.2 meters will require the use of bracing, shoring, laid back sideslopes, or constructed with the use of a properly designed trench box to protect workers, equipment, and adjacent structures. Excavated material shall be stockpiled in an orderly manner no closer than a distance equal to the depth of the excavation from the top of the excavation. Adequate drainage shall be provided to keep surface runoff from flowing into all excavations.

11 PAVEMENT AND PARKING AREAS

Topsoil shall be removed and stored in a designated area until completion of the project. After stripping the topsoil the subgrade shall be scarified to a depth of eight inches and recompacted to the specified density and moisture content prior to placement of the base course or first layer of fill. The pavement subgrade and any additional structural fill shall be compacted to the specifications presented in Section 9, Site Preparation, of this report with the exception that expansive, cohesive soils shall be compacted to between 92 and 95 percent of the maximum density.

Pavements shall be designed with a modulus of subgrade reaction of 100 pounds per cubic inch (pci). If the grading plan requires the pavement to bear directly on limestone or shale, a curb drain wrapped in geotextile filter fabric shall be installed on the upslope portion of the pavement to intercept and drain water away from the pavement. The curb drain shall consist of a rapid drainage layer composed of crushed rock with a maximum particle size of 37.5-mm and a maximum of 0 to 5 percent passing the #16 sieve. The curb drain may also incorporate a perforated collection pipe if computations reveal the need for a drainage volume be ond the capability of a curb drain to carry alone

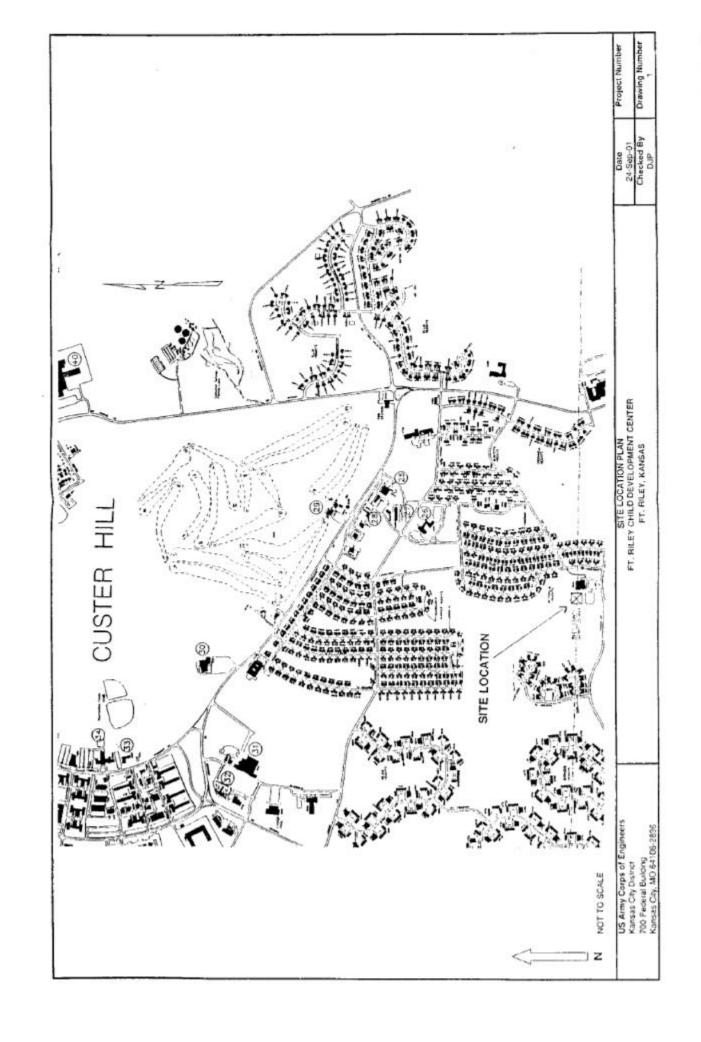
To reduce potential problems associated with the on-site high plastic clay, a minimum of 5 percent lime by weight may be incorporated into the upper 8 inches of the subgrade. The moisture content of a lime-modified subgrade shall be adjusted either by moistening or aerating as required to a range of -2 to +2 percent of optimum moisture. A limemodified subgrade for pavements shall be compacted to 95 and 100 percent of the maximum density by ASTM D-1557 for rigid and flexible pavements, respectively.

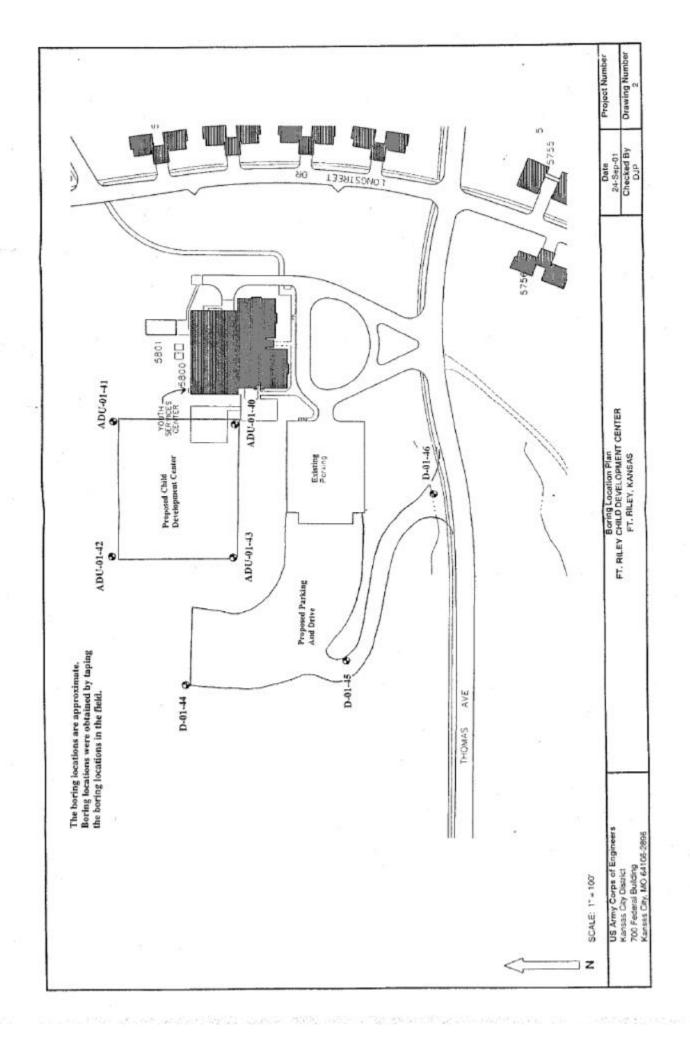
Flexible pavement base Course shall be compacted to a minimum of 100 percent of the maximum density as determined according to ASTM D-1557, methods B, C, or D. Rigid pavement base course materials shall be compacted to a minimum of 95 percent of the maximum density determined according to ASTM D-1557 methods B, C, or D.

Compaction of cohesive materials beneath grassed areas or sidewalks need only be compacted to a maximum of 85 percent of the maximum density. In-place field density tests shall be obtained in accordance with ASTM methods D-1556 or D-2922 in conjunction with ASTM D-3017. Field density tests shall be performed at a frequency of not less than one test per lift for every 1,000 square meters of embankment or subgrade. Laboratory density and moisture testing shall be performed at a rate of one test per 500 cubic meters of material placed or when a change in material occurs. During construction of embankments or fills, the working surface shall be sloped to a degree sufficient to prevent the ponding of water. After pavement base completion, newly graded areas shall be protected from damage caused by traffic and erosion.

12 PLAYGROUND AREA

The proposed playground area is to be constructed with a synthetic rubber surface. Experience has shown that the rubber surface will allow surface water to infiltrate to the subgrade and cause the playground subgrade to soften and deteriorate with time. To drain subsurface water away from the playground and to help prevent water from deteriorating the playground subgrade, the upper 150-mm of the playground subgrade shall consist of a rapid drainage layer. A perforated pipe wrapped in geotextile filter fabric may also be used in conjunction with the rapid drainage layer to collect the subsurface water and direct the water away from the playground if computations indicate the need for more drainage than the rapid drainage layer alone can provide.





	GRA	APPROAL KET	TO BORING L	UGS	
SOIL TYPE		GRAPHICAL	SYMBOLS		
GRAVELS	Well-Grade	GP-SP	GP-GM	Poorty-Graded [1-1] GM GP-GC	GC G
SANDS	Well-Grade SW SW-SM ,	sp-gp	SP SP-SM	Poorly-Graded SM SP-SC	sc s
SILTS and CLAYS	Silts ML	ШШ мн	CL CL	Clays CH	CL-MI
SPECIAL SYMBOLS	CL w/Sand	CH w/Sand	Low Plastic Till	High Plastic	Loess
ORGANIC SOILS	Organic Silts OL	он	Ø or	Organic Clays OH	전 전 전 전 Peat
MISCEL- LANEOUS	Asphalt	Concrete	Topsoil	FIII	Void
GNEOUS ROCKS	Granite	Breccia	Basalt	Lava	///
METAMORPHIC ROCKS	Quartzite	Gneiss	Schist	Soapstone	Marble
SEDIMENTARY	Limestone	Dolomite Conglomerate	Shale Siltstone	Sandstone	Mari Chalk
MODIFIERS	above) may replace the	right half of any prima	Cemented Thools to form new symbol Thought to form new s	Caliche ols. The fill symbol (see mbol to differentiate betwic clays.	Chert Miscellaneous veen fill types.
PRILLING	Solid-Stem Auger	Hollow-Stem Auger	Tri-Cone/ Mud-Rotary	NX Rock Core	Rock Drilling

BORING LOG NOMENCLATURE SHEET The relative density of coarse-grained soils (sands and gravels having TERM IDENTIFICATION AND DESCRIPTION less than 50 percent passing the number 200 sieve) is indicated by the Split-Spoon Sample (Standard Penetration Test): A 2-inch SPT uncorrected SPT test result (N-Value or blow count) in accordance with O.D., 1.5-inch I.D., split-barrel, 18 to 30-inch long sampler is the relationships given below: driven by blows from a 140-pound hammer falling 30-inches. The number of blows required to advance the sampler three RELATIVE DENSITY BLOW COUNT (N-VALUE) 6-inch increments are counted (See Sampling resistance Very Loose Loose 5 to 10 C California Sample: Thick-wall sampler containing four nominal 2-inch diameter, 4-inch long brass liners. The sampler is Medium Dense 11 to 30 hydraulically pushed a maximum of 12 inches. Dense 31 to 50 ST Shelby Tube sample: Hydraulically-pushed, 3-inch diameter, Very Dense Greater than 50 thin-walled tube used for obtaining undisturbed soil samples. CME CME 3-inch diameter continuous soil sampling system. The shear strengths of silts and clays (fine-grained soils having more than 50 percent passing the #200 sieve) are directly related to the torvane reading (TV) and my be taken to be equal to one half of the unconfined compressive strength (Qu) of the soil. Furthermore, the pocket PS Nominal 3-inch diameter Shelby tube piston sampler. penetrometer reading (PP) approximates Qu which is related to D Disturbed sample or auger cuttings consistency and manual methods as indicated in the following table: NX-size (2.155-inch diameter) rock core sample obtained UNCONFINED NX using a diamond bit and recirculating water (See RQD COMPRESSIVE below). CONSISTENCY MANUAL PROCEDURE STRENGTH (ksf) PP Pocket Penetrometer measurement indicative of soil < 0.5 Very Soft Extrudes between fingers unconfined compressive strength (ksf). Soft > 0.5 to 1 Molded by slight pressure TV Torvane measurement of soil shear strength (tsf). W % Medium Stiff > 1 to 2 Molded by strong pressure As-received water content (percent) SHIF >2 to 4 Indented by thumb LL. PL Liquid Limit, Plastic Limit Very Stiff > 4 to 8 Indented by thumbnail DI Plasticity Index Hard > 8 Difficult to indent usc Unified Soil Classification Qu Minor Soil Constituent Terms and Definitions Unconfined compressive strength (ksf). RQD Rock Quality Designation: The sum of the lengths of intact Trace Less than 5 percent core pieces 4 or more inches (10 cm) in length, measured Few Between 5 and 10 percent along the center line of the core, and expressed as a I ittle Between 10 and 25 percent percentage of the length cored. Recovery: The length of recovered soil or rock sample REC Between 25 and 50 percent expressed as a percentage of the sample length or depth Coarse Grain Descriptors cored. Boulder > 12 inches Point of groundwater entry. ¥ Stabilized groundwater level at some time after drilling. Cobble 3 inches to 12 inches SAMPLING RESISTANCE Coarse Gravel 3 inches to 3/4 inches Fine Gravel 3/4 inches to #4 sieve Sampler pushed by hydraulic system. Numbers indicate the number of blows from a 140-pound The Graphical Key to Boring Logs shows the graphical symbols used on 3 hammer falling freely for 30 inches required to drive the SPT boring logs and generalized, geologic cross-sections of selected boring sampler 6 inches. The SPT test result, N-value, or blow logs. The basic Unified Soll Classification System (USCS) designations count, is the number of blows required to drive the sampler are used for soils. The basic letter types are as follows: G - Gravels, the last 12 inches. The N value for this example is 15. S - Sands, M - Silts (M comes from the Swedish word mo for rock flour), 50/2" The split-spoon sampler was driven 2 inches by 50 blows; the W - Well graded, P - Poorty graded, C - Clay, H - High Plastic (fat), and Standard Penetration Resistance, or N-value, is set at 100. L - Low Plastic (lean). Dual classification designations show the primary soil type throughout the graphic column, and the secondary soil type ABBREVIATIONS USED appears in the right half of the column. CL-CH, SP-GP, and GP-SP are HSA Hollow-Stem Auger examples. SSA Solid-Stem Auger MOISTURE CONDITION TERM ATD At the time of drilling Water content is less than the plastic limit; dry to the touch Dry AD After Drilling Moist Water content is greater than the plastic limit, but the soil DWI Drill Water Loss DWR may be damp but no visible water Drill Water Return Wet Soil exhibits free water or is obviously saturated. ND Not Determined

BORING LOG NOMENCLATURE SHEET FOR ROCK

Scale of Relative Rock Hardness:

Term

Field Identification

Approx. Unconfined Compressive Strength

Very Soft

Can be pealed by a pocket knife

5 to 100 ksf

Soft

Small thin pieces can be broken by finger

100 to 500 ksf

Medium Hard

Can be groved by firm pressure of knife

500 to 1000 ksf

Moderately Hard

Requires one hammer blow to fracture

1000 to 2000 ksf

Hard

Hard hammer blow required to break;

.....

Can be scratched with knife only with difficulty

2000 to 5000 ksf

Very Hard

Cannot be scratched by knife;

Several hard blows of a hammer required to break

> 5000 ksf

Bedding thickness:

Term

Thickness Range

Massive

> 5'

Very Thick

3' to 5'

Thick

1' to 3'

Medium

4" to 1'

Thin

1" to 4"

Very Thin

1/2" to 1"

Unit

Single bed

Weathering Descriptions:

Term

Description

Fresh

No visible signs of material weathering

Slightly Weathered

Some discoloration of rock and discontinuity surfaces

Moderately Weathered

Up to half of rock is decomposed;

Discoloration is apparent in portion of rock mass

Highly (very) Weathered

Rock mass is more that 50% decomposed; Discoloration throughout rock mass

Rock Quality Designation (RQD):

RQD

Rock Mass Description

90-100

Excellent

75-90

Good

50-75

0000

25-50

Fair

m over e

Poor

Less than 15

Very Poor

U	\mathbf{R}	S						(GR	APHIC BORING LOG A	DU-			
PRO	DJEC	T	NAN	AE:	•••				_ (child Development Center SHEET				
PRO	DIEC	7 L	.00	ATI	ON:	ark	-		-	Fort Riley, KS PROJECT RILLING CO: USACE RIG:	NO:	ME-		
LUC	DEAC) B	Y:	1/07	TON:	ark	er	_		RILLING CO: USACE RIG:				
GR	OLIN	DW.	ATI	ER E	NTP	·	-	-	. E	LEVATION DATUM: DATE:		9-5-0	1	
OR	SER	JΔT	101	18.	No w	rate	r d	etec	cted	ELAYED GROUNDWATER: NORTH: EAST:				-
	T		-	AMI	PIFF	ΔT	Δ	_		EAST.	_		_	T-
DEPTH (feet)	, and	RECOVERY	LENGTH	/REC (%)	COMPONENTS	ER (%)	pcf)	(SF)	Qu (ksf)	DESCRIPTION		30L	ELEVATION (feet)	LING
0_	TYPE	REC	Rab	Rab	RES	WAT	70	PP (ď			SYMBOL	5. 	DRILLING
]									Stiff, dry, light to dark brown, Low Plastic CLAY (CL) with fi- gravel and roots (residuum)	ne			
	SPT			73	4 4	14	H	H		LL = 48; PL = 18				11
					6						3.0	M		K
	ST	I		100	P	20 17	105		3.9	Stiff, damp, light to medium brown, High Plastic CLAY (CH) (residuum) LL = 51; PL = 17				
5_	SPT	E		100	3	17	-	-	H			M		NI
7,	-				4 7									W
	\vdash		H	-		-		\vdash	-			1		MI
3.5	1											M		12
	1									a .		M		MI.
10	1			3										115
10											10.0	M		
(54) (51) (57)	SPT			100	4	20				Stiff to very stiff, damp to moist, tan to yellowish brown, Low Plastic CLAY (CL) (residuum)				1
	<u> </u>			_	7					LL = 32; PL = 20		M	V.	4
7	1			ì								M		112
85	SPT		Ц	67				Ц		Becomes wet at 12.5'		M		
	SPI			67	11					Limestone stringer at 13.3' to 13.4'		M		116
15_	-				15		_			Very wet at 14' to 14.4' LIMESTONE: Very weathered, soft to hard, yellowish to lig.	14.4	1		M
10_	SPT			100	42 50/3.6					gray, with shale partings		\$ 1		11
	H			=	0.010		Н		-			3 10		H
				\neg						BOTTOM OF BORING ADU-01-40 AT 16.5 FEET	16.5	-		4
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PRO	JEC	TL	.00	ATI	ON:		-			Fort Riley, KS	PROJECT			
LOG	GE	DB	Y:		R.P	ark	er		D	Fort Riley, KS RILLING CO: USACE	RIG;		-55	_
SUR	RFAC	ÆΕ	ELE	VAT	TON:				E	LEVATION DATUM:	DATE:	9-5-0	01	
GRO	NUC	DW	ATI	ER E	NTR	Y:_		_	D	ELAYED GROUNDWATER:	NORTH:			
OBS	ER\	/AT						ete	ctec	ATD	EAST:			
	-	_	5	AMI	PLED	AT/	<u>A</u>	_	_				z	Г
o (feet)	TYPE	RECOVERY	RQD LENGTH	RQD/REC (%)	RESISTANCEIN	WATER (%)	Y _d (pcf)	PP (KSF)	Qu (ksf)	DESCRIPTION		SYMBOL	ELEVATION (feet)	DRILLING
		Γ	П			Г	Г			Stiff, dry, dark brown, Low Plastic CLAY (CL) with roots	1//	1	T
	_	L			L							1//	1	M
	SPT			47	5 6 6	14				LL = 45; PL = 19				
	ST			100	P	19	104		7.6	Becomes damp and medium brown				
5_													1	
	SPT			80	5									ll b
-					6			L				1//		
8														Ы
									Ц	With thin yellowish gray limestone lenses fro	m 7.5' to 8.4'			И
	SPT		-	100	24 0/1.2	_	-		Н	LIMESTONE: Hard, gray		8.4		11
0_										BOTTOM OF BORING ADU-01-41 AT	8.6 FEET			
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5_														
													1	
										2 2				
-													1	
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PRO	JEC	TL	.00	ATI	ON:			_	_	hild Development Center Fort Riley, KS RILLING CO: USACE	PROJECT N		
LOG	GEI	DB	Y:	927	R. P	ark	er		D	RILLING CO: USACE	RIG:	CME-5	
SUR	FAC	EE	LE	VAT	TON:				E	LEVATION DATUM:	DATE:		1
GRO	UNI	DW.	ATE	RE	NTR	Y:_			D	ELAYED GROUNDWATER:	NORTH:		
OBS	ERV	/AT	101	IS:	No w	rate	r de	ete	tec	ATD	EAST:		
	-	_		AMI	LE D	ATA	A	_	_				z
DEPTH o (feet)	TYPE	RECOVERY	RQD LENGTH	RQD/REC (%)	RESISTANCEM	WATER (%)	γ _d (pcf)	PP (KSF)	Q, (ksf)	DESCRIPTION		SYMBOL	ELEVATION (feat) DRILLING
						Г				Stiff, dry to damp, medium brown, High Plastic (residuum)	CLAY (CH)		
	SPT			87	3 3 6								Í
	ST		_	86	P	-	-	H	Н	Stiff to very stiff, damp, yellow to yellowish bro	wn, Low Plastic		K
	SPT	٥	-	100	6	15	-	-	Н	CLAY (CL) (residuum) LL = 31; PL = 20			
5					12								6
	SPT	Ħ	-	100	13	H			\vdash			<i>M</i>	
10.0					0.6		-		-			- 1/2	1
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1										159			
	SPT			100	21 31	17							N
•					50								
10_	SPT	Н	-	100	50/1.2		-	_	_			M	9
												112	
	- 2								٦	BOTTOM OF BORING ADU-01-42 AT 1	1.2 FEET	- 172	
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15_									- 1				
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-			1										
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-		-						1					
25			- 1	- 1	- 1	- 1	- 1	- 1					

U	R	S				al Co		(GR	APHIC BORING LOG hild Development Center SHEET 1			
PRO	JEC	T	IAN	IE:		_	-	_	0	hild Development Center SHEET 1			
I PKU	ルニし	, I L	·	AII	UN:					PROJECT NO:	CME		_
SUR	FAC	EE	LE	VAT	ION:				E	RILLING CO: USACE RIG: LEVATION DATUM: DATE: 9	4-01/	9-5-01	
GRO	UNI	DW	ATE	RE	NTR	Y:			D	ELAYED GROUNDWATER: NORTH:			
OBS	ERV	/AT	ION	IS:	No w	ate	r de	etec	ted	ATD EAST:	33.7		
	\sqsubset	_	S	AME	LE D	AT	<u>A</u>	_			\neg	z	T
DEPTH o (feet)	TYPE	RECOVERY	RQD LENGTH	RQD/REC (%)	COMPONENTS	WATER (%)	χ (pct)	PP (KSF)	Qu (ksf)	DESCRIPTION	SYMBOL	ELEVATION (feet)	DRILLING
-	Г	Г				Г				Stiff, dry, brown to reddish brown, Low Plastic CLAY (CL) with some fine sand and roots	0	7	Ī
										some line sand and roots	1	1	1
	SPT			53	7 5							1	
19	ST			100	4 P	27	_		-		1	1	K
	,			100		20	91		8.1		1	1 .	
5													K
	SPT		П	100	3 4	16				Gravel at 4.9' Becomes light yellowish gray	1	1	
87					6					Gravel at 5.5'		1	6
-										Gravel at 6.4'	1	1	
92	SPT	Ц		*nn	50/1.2						10	4	K
	311			100	Jur I					LIMESTONE: Hard	2		
10									-	SHALE: Very weathered, soft, dark brown	5		6
	SPT			100	13					STALE. Voly Weddisted, Soil, dark brown	2	PUT	
-				5	1/3.6"			Ц	_		3		1
15_		Organia Addi								BOTTOM OF BORING ADU-01-43 AT 11.3 FEET			
25													

PROJECT NAME: Child Development Center PROJECT LOCATION: Fort Riley, KS PROJECT NO: LOGGED BY: R. Parker SURFACE ELEVATION: ELEVATION DATUM: DATE: 9-5-01 GROUNDWATER ENTRY: DELAYED GROUNDWATER: NORTH: OBSERVATIONS: No water detected ATD SAMPLE DATA A HIGH STONE: A CONTROL OF THE STONE SHAPE SHAPE STONE SHAPE SHAPE STONE SHAPE STONE SHAPE	4
SURFACE ELEVATION: ELEVATION DATUM: DATE: 9-5-01 GROUNDWATER ENTRY: DELAYED GROUNDWATER: NORTH: DATE: 9-5-01 NORTH: EAST: H () 9-9) O	_1_
SURFACE ELEVATION: ELEVATION DATUM: DATE: 9-5-01 GROUNDWATER ENTRY: DELAYED GROUNDWATER: NORTH: OBSERVATIONS: No water detected ATD SAMPLE DATA H (19	-
GROUNDWATER ENTRY: OBSERVATIONS: No water detected ATD SAMPLE DATA ARBODO DESCRIPTION DESCRIPTION DESCRIPTION TORNAL SPT 1 18	
OBSERVATIONS: No water detected ATD SAMPLE DATA LEAST: DESCRIPTION OBSERVATIONS: No water detected ATD SAMPLE DATA LEAST: DESCRIPTION OBSERVATIONS: No water detected ATD DESCRIPTION OBSERVATIONS: No water detected ATD DESCRIPTION OBSERVATIONS: No water detected ATD DESCRIPTION OBSERVATIONS: PL = 23 SHALE: Severely weathered, soft, dry, yellow to yellowish dry ary LIMESTONE: Hard, gray BOTTOM OF BORING D-01-44 AT 2.6 FEET	
SAMPLE DATA 199 0 1 1 1 1 1 1 1 1	-
Stiff, dry, dark brown, High Plastic CLAY (CH) LL = 57; PL = 23 SHALE: Severely weathered, soft, dry, yellow to yellowish gray LIMESTONE: Hard, gray BOTTOM OF BORING D-01-44 AT 2.6 FEET	- T
Stiff, dry, dark brown, High Plastic CLAY (CH) LL = 57; PL = 23 SHALE: Severely weathered, soft, dry, yellow to yellowish gray LIMESTONE: Hard, gray BOTTOM OF BORING D-01-44 AT 2.6 FEET	(feet)
SHALE: Severely weathered, soft, dry, yellow to yellowish gray LIMESTONE: Hard, gray BOTTOM OF BORING D-01-44 AT 2.6 FEET 10_	h
SHALE: Severely weathered, soft, dry, yellow to yellowish gray LIMESTONE: Hard, gray BOTTOM OF BORING D-01-44 AT 2.6 FEET	k
BOTTOM OF BORING D-01-44 AT 2.6 FEET 5_ 10_	
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PRO							_	_	(hild Development Center	SHEET 1	OF	_ 1	
				ATI	ON: R. P	ark		_		Fort Riley, KS	PROJECT NO:	CME-		
LOG				VAT	ION.	aik	ei		. L	RILLING CO: USACE LEVATION DATUM:	RIG:	9-5-0		-
GRO	UNI	DW	ATE	RE	NTR	Y:				ELAYED GROUNDWATER:	NORTH:	-		
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			S	AMI	PLE D	ATA	Α					T	_	Т
O (feet)	TYPE	RECOVERY	RQD LENGTH	RQD/REC (%)	RESISTANCEIN	WATER (%)	Y _d (pcf)	PP (KSF)	Q. (ksf)	DESCRIPTION		SYMBOL	ELEVATION (feet)	DRILLING
		Г					Г		Г	Stiff, dry, dark brown, High Plastic CLAY (C				IT
	SPT			67						· SHALE: Severely weathered, soft, yellow to	o yellowish gray			K
										INTERBEDDED LIMESTONE AND SHALE	Soft to hard dry	0		K
	SPT				50/4	-	-			yellow to yellowish gray	3	8		Щ
5										LIMESTONE: Hard, gray BOTTOM OF BORING D-01-45 AT	3.9 FEET			
														1
-														1
4														
95							1							
10_														l
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25														

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PRO	DJEC	TN	IAN	IE:		_		_	C	hild Development Center	SHEET 1	OF	_1	
										Fort Riley, KS	PROJECT NO:			
										RILLING CO: USACE LEVATION DATUM:	RIG:			_
GR	OUN	DW	ATE	RE	NTR	Y:			- D	ELAYED GROUNDWATER:	NORTH:			
										ATD	EAST:			
	E	_	S	AMI	PLED	ATA	Ą					T	7	Т
DEPTH (feet)	TYPE	RECOVERY	RQD LENGTH	RQD/REC (%)	RESISTANCEIN	WATER (%)	Y _d (pcf)	PP (KSF)	Q. (ksf)	DESCRIPTION		SYMBOL	ELEVATION (feet)	DRILLING
_	Т					Г	Г	Г		Stiff, dry, dark brown, High Plastic CLAY (CH	i) with roots			T
-	SPT	\vdash	-	-	2_	16	-	H						1
(3)					7					WEEDERSON OUT OF THE PARTY OF T		2.0		N
					-				-	INTERBEDDED SHALE AND LIMESTONE: thinly bedded, yellow to light gray		2.9		
	1						-			BOTTOM OF BORING D-01-46 AT 2	L9 FEET			Г
68	1			. 1	- 1									ı
5_	-													l
5	1	П							П					
	-							П						
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25	1			- 1		- 1	- 1	. 1				1 1		

CANADA MANDE SERVICE S

APPENDIX B - LABORATORY TEST RESULTS

FILENAME: 10-09-01-REPORT.XLS

ENGINEER DARYL PADUSKA

PROJECT: FORT RILEY

DATE: 9-Oct-01

MOLT ACIDISON IO DA	LAB CLASSIFICATION	CL	СН		CL	
BERG	Id	30	34		12 (
ATTERBERG	77	48	51		32	
000	-200					
W.MCT	/orwio/	14%	17%	17%	20%	
DEPTH	TO	3.0	4.9	6.5	11.5	
DE	FROM	1.5	3.0	5.0	10.0	
BORING SAMPLE	NUMBER	11	Wax 1	J3	J4	
BORING	NUMBER	ADU-40	ADU-40	ADU-40	ADU-40	
VISUAL	GROUP	1	,	-	2	

FILENAME: 10-09-01-REPORT.XLS

ENGINEER DARYL PADUSKA

PROJECT: FORT RILEY DATE: 9-0ct-01

MOIT A CITIES OF TO GALL	LAB CLASSIFICATION	CL				
BERG	PI	26				
ATTERBERG		45				
000	2007-					
D' BACT	/olvio/	14%	%0			
DEPTH	TO	3.0	4.9		*	
DE	FROM	1.5	3.0			5
SAMPLE	NUMBER NUMBER FROM	11	WAX 1			
BORING SAMPLE	NUMBER	ADU-41	ADU-41			
VISUAL	GROUP	3	1			

FILENAME: 10-09-01-REPORT XLS
ENGINEER DARYL PADUSKA
PROJECT: FORT RILEY
DATE: 9-0ct-01

TOTAL COLOR	LAB CLASSIFICATION	OF.				
BERG	PI	=				
ATTER	LL PI	31				
000	2002-					
TOTAL	CINIO/	15%	17%			
PTH	M TO	5.2	0.6	200.2		
DE	FROM	3.7	8.0			
SAMPLE	NUMBER	13	35			
VISUAL BORING SAMPLE	NUMBER NUMBER	ADU-42	ADU-42			
VISUAL	GROUP	2	2			

FILENAME: 10-09-01-REPORT.XLS
ENGINEER DARYL PADUSKA
PROJECT: FORT RILEY

9-Oct-01 DATE:

NOTASSIEICATION	LAB CLASSIFICATION					
ATTERBERG	PI					
ATTER	77					
000	-200					
TOLANOT	CIVIO/	20%	16%			
DEPTH	10	4.9	6.5			
DE	FROM	3.0	5.0			
SAMPLE	NUMBER	WAX 1	13			
BORING SAMPLE	NUMBER NUMBER	ADU-43 WAX 1	ADU-43			
VISUAL	GROUP	1	2		N. LOUIS STORY	

FILENAME: 10-09-01-REPORT.XLS
ENGINEER DARYL PADUSKA
PROJECT: FORT RILEY
DATE: 9-0ct-01

MOIT A SIGNA IS BA		LH2			
ATTERBERG	PI	34			
ATTER	LL	57			
000	-200				
TOLACT	/olvio/	18%			
DEPTH	TO	2.0			
	FROM	1.0			
SAMPLE	NUMBER F	11			
BORING SAMPLE	NUMBER	D-44			
VISUAL	GROUP	4			

FILENAME: 10-09-01-REPORT.XLS
ENGINEER DARYL PADUSKA
PROJECT: FORT RILEY
DATE: 9-0ct-01

I AB CLASSIEICATION	LAB CLASSIFICATION				
ATTERBERG	PI				
000	-200				
TOWN TOWN	OIMB/	16%			
PTH	DM TO	2.0			
DE	FROM	1.0			
SAMPLE	NUMBER FROM	11			
BORING SAMPLE	NUMBER	D-46			
	GROUP	4			

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

DATE:

9-Oct-01

PROJECT: FORT RILEY BORING NO.: ADU-40

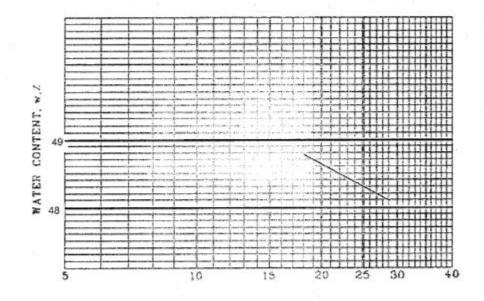
JOB:

SAMPLE NO .: J1

LIQUID LIMIT									
RUN NO.	1	2	3	4	5	6			
TARE NO.	25	26							
TARE PLUS WET SOIL	4535	4291							
TARE PLUS DRY SOIL	3473	3318							
WATER	1062	973	20000						
TARE	1298	1296							
DRY SOIL	2175	2022							
WATER CONTENT, %	48.8	48.1				: PETER			
NUMBER OF BLOWS	23	29	G41932-2572			100			

PAN 239

SOIL CLASSIFICATION CL-LEAN CLAY



18 30 PL

	PLASTIC L	IMIT				NATURAL WATER
RUN NO.	1	2	3	4	5	CONTENT
TARE NO.	27	28				
TARE PLUS WET SOIL	4706	5451				
TARE PLUS DRY SOIL	4190	4824		1		1
WATER	516	627				
TARE	1295	1292			701 (100)/16-1-10	
DRY SOIL	2895	3532	00-00-0000			
WATER CONTENT%	17.8%	17.8%				
PLASTIC LIMIT	18	18				

REMARKS X

TECHNICIAN PRN

COMPUTED BY COMPUTER

CHECKED BY PRN

ENG

FORM 1-Jun-65

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

DATE:

9-Oct-01

PROJECT:

FORT RILEY

BORING NO .: ADU-40

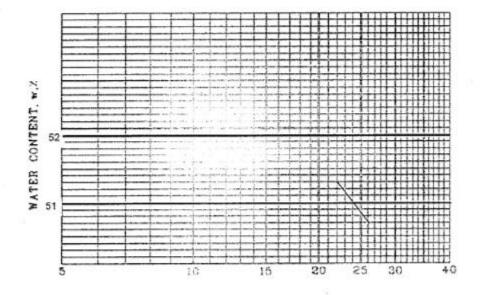
JOB:

SAMPLE NO.: WAX 1

LIQUID LIMIT									
RUN NO.	1	2	3	4	5	6			
TARE NO.	1	2							
TARE PLUS WET SOIL	3804	3688			Since 5				
TARE PLUS DRY SOIL	2954	2882							
WATER	850	806							
TARE	1298	1292	111						
DRY SOIL	1656	1590			Anamara -				
WATER CONTENT, %	51.3	50.7	race -						
NUMBER OF BLOWS	. 22	26							

PAN 198

SOIL CLASSIFICATION CH-FAT CLAY



LL 51 PL 17 PI 34

	PLASTIC L	TIMIL			O CONSTRUCT	NATURAL WATER
RUN NO.	1	2	3	4	5	CONTENT
TARE NO.	3	4		1		1 2 2 2 2
TARE PLUS WET SOIL	3794	3618	- 11/13/			
TARE PLUS DRY SOIL	3431	3279				
WATER	363	339				
TARE	1293	1290				
DRY SOIL	2138	1989				
WATER CONTENT%	17.0%	17.0%				
PLASTIC LIMIT	17	17		121	Barren Contract	

REMARKS X

TECHNICIAN PRN

COMPUTED BY COMPUTER

CHECKED BY PRN

ENG

FORM 1-Jun-65

LIQUID AND PLASTIC LIMIT TESTS For use of this form, see EM 1110-2-1906. DATE: 9-Oct-01 FORT RILEY PROJECT: JOB: BORING NO.: ADU-40 SAMPLE NO.: J4 LIQUID LIMIT 5 RUN NO. 2 3 4 6 1 TARE NO. 5 6 TARE PLUS WET SOIL 4240 4185 TARE PLUS DRY SOIL 3522 3491 718 WATER 694 1294 TARE 1294 DRY SOIL 2228 2197 WATER CONTENT, % 32.2 31.6 NUMBER OF BLOWS 24 27 PAN 390 SOIL CLASSIFICATION CL-LEAN CLAY LL 32 PL 20 CONTENT. 12 WATER NATURAL PLASTIC LIMIT WATER 2 3 4 5 CONTENT RUN NO. 8 TARE NO. TARE PLUS WET SOIL 4529 4431 4003 3903 TARE PLUS DRY SOIL WATER 526 528 1292 1291 TARE 2711 2612 DRY SOIL 19.4% 20.2% WATER CONTENT% 19 20 PLASTIC LIMIT REMARKS X COMPUTED BY COMPUTER CHECKED BY PRN TECHNICIAN PRN

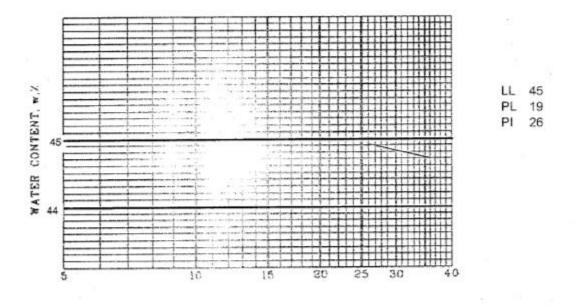
ENG FORM

LIQUID AND PLASTIC LIMIT TESTS For use of this form, see EM 1110-2-1906. DATE: 9-Oct-01 PROJECT: FORT RILEY BORING NO.: ADU-41 SAMPLE NO.: J1

LIQUID LIMIT										
RUN NO.	1	2	3	4	5	-				
TARE NO.	17	18								
TARE PLUS WET SOIL	4371	4508								
TARE PLUS DRY SOIL	3417	3514		- 10-state						
WATER	954	994								
TARE	1293	1290	11							
DRY SOIL	2124	2224	_= one.el	11						
WATER CONTENT, %	44.9	44.7	an 3							
NUMBER OF BLOWS	. 27	- 36								

PAN 235

SOIL CLASSIFICATION CL-LEAN CLAY



	PLASTIC L	IMIT				NATURAL WATER
RUN NO.	1	2	3	4	5	CONTENT
TARE NO.	19	20		•.		
TARE PLUS WET SOIL	4806	4137				
TARE PLUS DRY SOIL	4238	3677				
WATER	568	460				
TARE	1293	1292				
DRY SOIL	2945	2385				
WATER CONTENT%	19.3%	19.3%		100000		
PLASTIC LIMIT	19	19				

REMARKS X

TECHNICIAN PRN COMPUTED BY COMPUTER CHECKED BY PRN

ENG

FORM 1-Jun-65

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

DATE:

9-Oct-01

PROJECT:

FORT RILEY

BORING NO.: ADU-42

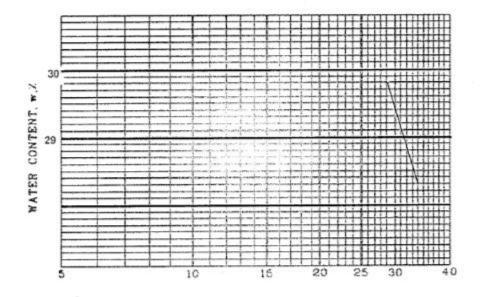
JOB:

SAMPLE NO .: J3

LIQUID LIMIT									
RUN NO.	1	2	3	4	5	6			
TARE NO.	9	10							
TARE PLUS WET SOIL	4118	4363							
TARE PLUS DRY SOIL	3470	3687			1				
WATER	648	676		WWW.					
TARE	1293	1296	S- 1						
DRY SOIL	2177	2391							
WATER CONTENT, %	29.8	28.3		27 -1-2001	Carren III				
NUMBER OF BLOWS	. 29	34	HIII. GRIES						

PAN 168

SOIL CLASSIFICATION CL-LEAN CLAY



LL 31 PL 20 Pl 11

	PLASTIC L	IMIT				NATURAL WATER
RUN NO.	1	2	3	4	5	CONTENT
TARE NO.	11	12		54		
TARE PLUS WET SOIL	3388	3731				
TARE PLUS DRY SOIL	3039	3321				*
WATER	349	410	1 1 1 1			
TARE	1294	1293				
DRY SOIL	1745	2028	7000			
WATER CONTENT%	20.0%	20.2%				
PLASTIC LIMIT	20	20				

REMARKS X

TECHNICIAN PRN

COMPUTED BY COMPUTER

CHECKED BY PRN

ENG

FORM 1-Jun-65

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

DATE:

9-Oct-01

PROJECT:

BORING NO.: D-44

FORT RILEY

JOB:

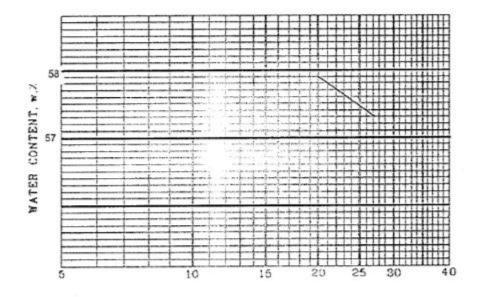
ILE T

SAMPLE NO.: J1

LIQUID LIMIT										
RUN NO.	1	2	3	4	5	6				
TARE NO.	29	30			1					
TARE PLUS WET SOIL	3881	4203								
TARE PLUS DRY SOIL	2935	3146								
WATER	946	1057								
TARE	1300	1300								
DRY SOIL	1635	1846								
WATER CONTENT, %	57.9	57.3			i j					
NUMBER OF BLOWS	- 20	27								

PAN 362

SOIL CLASSIFICATION CH-FAT CALY



LL 57 PL 23 PI 34

	PLASTIC L	IMIT		*****		NATURAL WATER
RUN NO.	1	2	3	4	5	CONTENT
TARE NO.	31	32		*.		
TARE PLUS WET SOIL	3899	3967	- 1504			
TARE PLUS DRY SOIL	3406	3462				
WATER	493	505		-787		
TARE	1299	1295	HIV-BOLLY			
DRY SOIL	2107	2167	100000			
WATER CONTENT%	23.4%	23.3%				
PLASTIC LIMIT	23	23				

REMARKS X

TECHNICIAN PRN

COMPUTED BY COMPUTER

CHECKED BY PRN

ENG

1-Jun-65

Maxim Technologies Inc. Kansas City, KS

Table 1 - Summary of Classification Tests

Project:

Fort Riley Child Development Center

Wax Samples

ADU-40 Wax-1	
3.0' - 4.9'	Lean Clay CL, reddish brown, uniform throughout sample, moist, stiff
ADU-41 Wax-1	
3.0' - 4.9'	Lean Clay CL, reddish brown, uniform throughout sample, moist, stiff
ADU-43 Wax-1	
3.0' - 4.9'	Lean Clay CL, reddish brown, trace of gravel, uniform throughout sample, moist, stiff

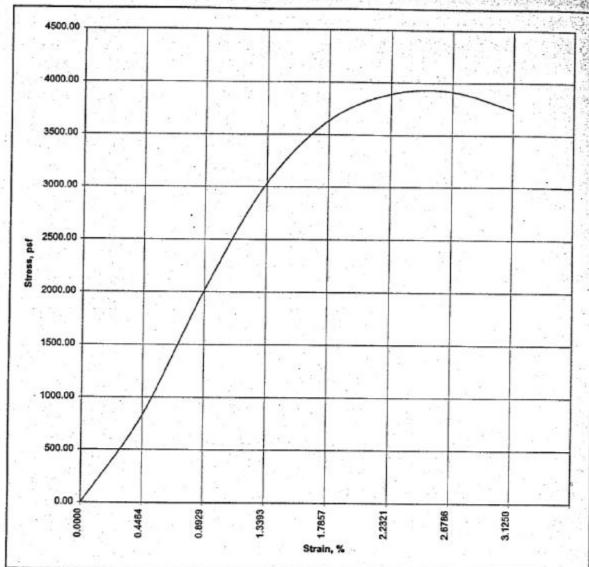
Maxim Technologies Inc. Soil Classification Record Sheet Fort Riley Child Development Center

Depth to Bottom of	Cample			tterberg Limits	Gra		ng (cumulative Percents Finer) U.S. Standard Sieve Size					
Sample	Number		LL	PI	200	80	40	20	10	4 Classification		Remarks
ADU-40	Wax-1	20.0								Lean Clay	CL	1
ADU-41	Wax-1	19.3								Lean Clay	CL	-
ADU-43	Wax-1	27.3								Lean Clay, w/ trace gravel	CL	1

Maxim Technologies INC. Unconfined Compression Test

Boring No.: ADU-40	Wax-1 Depth:	3.0' - 4.9'		Date:	10/1/2001	
Tare No. K2K		Sample wet weight 1127.66 g.				
Tare plus wet weight	. 87.86	g.	Height		5.600 in.	
Tare plus dry weight	76.79	g.	Diameter		2.791 in.	
Tare weight	21.53	g.				
Deformation in.	Proving Ring Dial Reading lbs.	Actual Load lbs.	Stress psf	Strain	Proving Ring Constant	
0.0000	0.0	0.0	0.00	0.0000	(0.456)(Reading)+3.47	
0.0250	70.0	35.4	832.98	0.4464	100 AND 10205	
0.0500	180.0	85.6	2013.60	0.8929		
0.0750	275.0	128.9	3033.23	1.3393		
0.1000	331.0	154.4	3634.27	1.7857		
0.1250	355.0	165.4	3891.86	2.2321	2.7	
0.1500	357.0	166.3	3913.33	2.6786	n N .	
0.1750	341.0	159.0	3741.60	3.1250		
0.2000					3 92	
0.2250				0/2000	Picture	
0.2500					Before/After	
0.2750					100000000000000000000000000000000000000	
0.3000						
0.3500					11/	
0.4000		hanna I				
0.4500					- ()	
0.5000				100	.) '	
0.5500					1.	
0.6000					: / .	
0.6500						
0.7000						

Description:	Lean Clay, reddish brown, moist, stif	ī .	
Remarks:			
Technician:	Eric Walston		2000



	QU (psf)	Ta	WC%
1	3913	104.47	20.0

U.S. Army Corps of Engineers

Boring No.:

ADU-40 Wax-1

Depth 3.0' - 4.9'

Classification: Lean Clay, reddish brown, moist, stiff

Unconfined Compression Test

Technologies INC

721 S. Packard Kansas City, KS 66105 Telephone: 913-321-8100 Fax: 913-321-8181

Project: Ft. Riley Child Development Center Location: Ft. Riley, KS

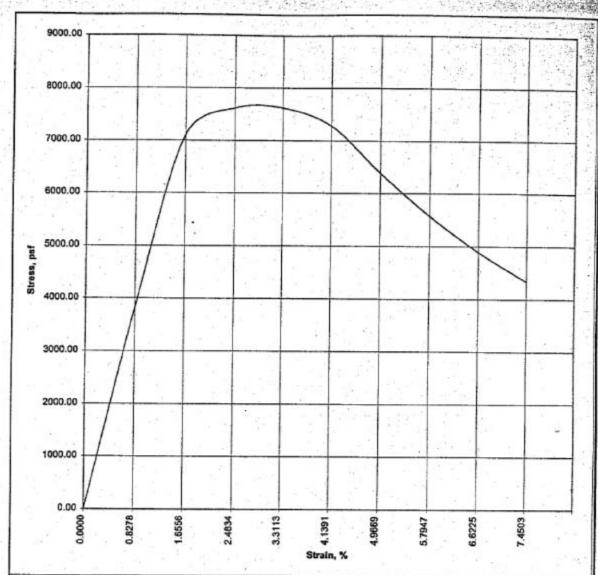
Job Number: 1390481

Client:

Maxim Technologies INC. Unconfined Compression Test

Boring No.: ADU-41	Wax-1 Depth:	3.0' - 4.9'		Date:	10/1/2001		
Tare No.	K2K		Sample w	et weight	151.20 g.		
Tare plus wet weight	. 51.90	g.	Height		3.020 in.		
Tare plus dry weight	46.99	g.	Diameter		1.400 in.		
Tare weight	21.52	g.			-		
Deformation in.	Proving Ring Dial Reading lbs.	Actual Load lbs.	Stress psf	Strain %	Proving Ring Constant		
0.0000	0.0	0.0	0.00	0.0000	(0.456)(Reading)+3.4		
0.0250	82.0	40.9	3822.40	0.8278			
0.0500	159.0	76.0	7106.92	1.6556	0.09		
0.0750	171.0	81.4	7618.80	2.4834	ergens to W		
0.1000	171.0	81.4	7618.80	3.3113	2		
0.1250	163.0	77.8	7277.55	4.1391			
0.1500	142.0	68.2	6381.77	4.9669	N. C. C.		
0.1750	123.0	59.6	5571.30	5.7947	198		
0.2000	107.0	52.3	4888.80	6.6225	- 19		
0.2250	94.0	46.3	4334.27	7.4503	Picture		
0.2500					Before/After		
0.2750							
0.3000							
0.3500				7.4			
0.4000		- 3					
0.4500							
0.5000					1 1		
0.5500					1 1 1		
0.6000		Angele version	12		1,10		
0.6500					11/		
0.7000							

Description:	Lean Clay, reddish brown, moist, stiff		10.00
Remarks:		A PARAMETER AND A TOTAL AND A STATE OF THE S	
Technician:	Eric Walston		



QU (psf)	70	WC%	
7619	103.89	19.3	

Boring No.:

ADU-41 Wax-1

Depth 3.0' - 4.9'

Classification: Lean Clay, reddish brown, moist, stiff

Unconfined Compression Test

Technologies INC

721 S. Packard Kansas City, KS 66105 Telephone: 913-321-8100 Fax: 913-321-8181

Client: U.S. Army Corps of Engineers Project:

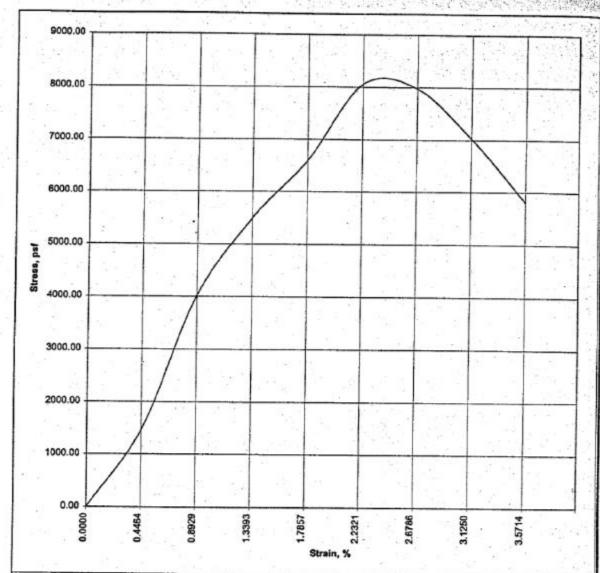
Ft. Riley Child Development Center Ft. Riley, KS

Location: Job Number: 1390481

Maxim Technologies INC. Unconfined Compression Test

Boring No.: ADU-43	Wax-1 Depth:	3.0' - 4.9'		Date:	10/1/2001		
Tare No.	are No. G3G Sample		Sample w	wet weight 1052.84 g.			
Tare plus wet weight	. 71.34	g.	Height		5.600 in.		
Tare plus dry weight	60.71	g.	Diameter		2.800 in.		
Tare weight	21.79	g.					
Deformation in.	Proving Ring Dial Reading lbs.	Actual Load lbs.	Stress psf	Strain %	Proving Ring Constant		
0.0000	0.0	0.0	0.00	0.0000	(0.456)(Reading)+3.47		
0.0250	130.0	62.8	1467.47	0.4464			
0.0500	370.0	172.2	4026.84	0.8929			
0.0750	508.0	235.1	5498.48	1.3393	0.00		
0.1000	611.0	282.1	6596.87	1.7857			
0.1250	748.0	344.6	8057.84	2.2321	V4.		
0.1500	740.0	340.9	7972.53	2.6786	000 Sto _ R. U		
0.1750	651.0	300.3	7023.43	3.1250			
0.2000	537.0	248.3	5807.73	3.5714			
0.2250					Picture		
0.2500					Before/After		
0.2750							
0.3000							
0.3500							
0.4000							
0.4500				7			
0.5000					1111		
0.5500					13/1		
0.6000							
0.6500)/\		
0.7000							

Description:	Lean Clay, reddish brown, with trace gravel, moist, stiff	
Remarks:		
Technician:	Eric Walston	
entracement in the contract of		



	QU (psf)	70	WC%	
1	8058	91.37	27.3	

Boring No.:

ADU-43 Wax-1

Depth 3.0' - 4.9'

Classification: Lean Clay, reddish brown, with trace gravel, moist, stiff

Unconfined Compression Test

721 S. Packard Kansas City, KS 66105 Telephone: 913-321-8100

Fax: 913-321-8181

Client:

U.S. Army Corps of Engineers Ft. Riley Child Development Center

Project: Location: Ft. Riley, KS

Job Number: 1390481

APPENDIX C - CALCULATIONS